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Improved Forge Hammer.

It is surprising that so much novelty as is embraced in this invention should be discovered in connection with a tilt hammer. The object of the invention is to make the force of the blow adjustable, so that one hammer instead of several may be employed for various kinds of work.

The arrangement is fully shown in the accompanying engraving. The helve, B, of the hammer, A, has its fulcrum near its end at *c*, and the spiral springs, *d d*, press the helve upward so as to balance the weight of the hammer, causing it to rest on or above the anvil with little or no pressure downward. The hammer is thrown upward for the blow by the connecting rod, E, which is operated by the curved arm, F, of the rock-shaft, G; this shaft being rocked by the arm, H, upon its opposite side by means of the rod, I, which is connected at its upper end with a crank upon the shaft of pulley, J. The most important part of the invention is in the connecting rod, E. This rod consists of a hollow cylinder, with a piston inside, the piston being connected with the helve by its head, K, and pressed inward by a stiff steel spring coiled spirally around it.

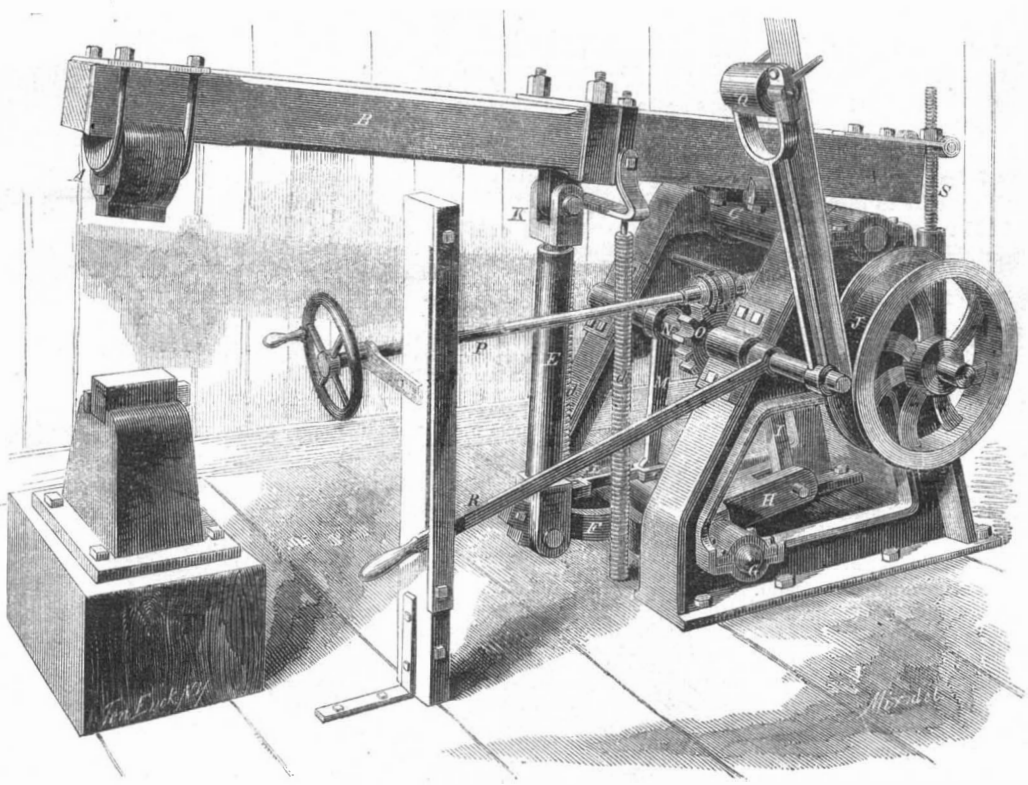
When the hammer is lifted up quickly by steam or other power, acting through the mechanism described, its momentum carries it still farther upward, drawing the piston partly out from the cylinder, E, and compressing the spiral spring, which always tends to keep the piston within the cylinder. It is by the reaction of this spring drawing the helve and hammer down that the force of the blow is obtained. As the rock-shaft, G, is operated by a crank, the connecting rod, E, is being carried down during the descent of the hammer, thus keeping up the tension of the spring, and increasing the force of the blow.

The lift of the hammer, and consequently the force of the blow, is varied at will by slipping the lower end of the connecting rod, E, along the curved arm, F, of the rock-shaft. This variation in the position of the connecting rod is effected by joining its lower end by means of the rod, L, with the arm, M, on the shaft, N; this shaft having upon it a pinion, O, which meshes into a worm upon the shaft, P. Upon the opposite end of the shaft, P, is a hand-wheel placed in a convenient position for the operator, and it will be seen that by turning this wheel he can carry the lower end of the connecting rod, E, along the arm, F, thus varying the lift of the hammer. As the face of the blow depends upon the extent to which the piston of the connecting rod, E, is drawn from the cylinder, and as this depends upon the velocity with which the hammer is raised, the weight of the hammer being balanced by the spiral springs, *d d;* this force may be reduced far below that due to the falling of the hammer through any distance whatever, and may be regulated with great accuracy.

The engraving represents the hammer as operated by a belt provided with a friction pulley, Q, for starting and stopping it; this pulley being pressed against the belt or removed by means of the lever, R. The spring, *s*, at the end of the helve is employed, if necessary, in aid of the springs, *d d*, to counteract the weight of the hammer, and balance it on the fulcrum. The same lever, R, that operates the friction pulley, also actuates a friction brake which works against a fly wheel on the shaft of pulley, J, and which stops and holds the hammer suspended at any hight desired above the anvil; superseding, by mechanism easily and safely operated, the dangerous and inconvenient gagging apparatus heretofore employed. The variation in the force of the blow may be made while the hammer is in operation. By this arrangement a much more powerful blow may be produced by a hammer of given size, and also a much lighter blow, than by the ordinary arrangement. It is also claimed to do a given amount of work with far less power than any other known. Three of these hammers are now in operation in this city—one at the Delamater Iron Works, one at the Allaire Works, and one at Fletcher & Harrisons, all giving perfect satisfaction.

The particular advantage claimed for this hammer is that it is adapted to all work, great and small, of a steam engine manufactory or other iron works.

The patent for this invention was granted October 9, 1860; and information in relation to it may be obtained by addressing the inventor, Edward Paye, or C. N. Delamater, who owns an interest in the invention, at the Delamater Iron Works, foot of 13th street, North River, New York.



PAYE'S IMPROVED FORGE HAMMER.

THE worms from an ounce of silkworm eggs will devour in one month one thousand six hundred and nine pounds of leaves.

Naval Steam Engines.

A very desirable, and, in fact, almost indispensable requisite of all steam war vessels, is that the engines and boiler should be carefully protected from shot. If the engine is disabled, the vessel is completely at the mercy of the enemy, except in those cases where the steam power is merely auxiliary to the sails. The problem to be solved in the construction of all naval engines, is to so arrange and dispose the engines, boiler, connections and propeller that all may be entirely below the water line of the vessel. In steam frigates with large draft of water, this is always accomplished and without much difficulty. With war vessels of light draft the problem is more difficult.

It is hardly to be expected, that the steam vessels purchased or chartered by our government for use in the present emergency can have machinery fulfilling the above requisites, and, indeed, very few of them are at all adapted for the purpose. Two gun boats, now lying at the Brooklyn Navy Yard in a forward state of preparation for active service, may be severely criticised on the points above mentioned, though perhaps to no greater degree than many others in the service. We refer to the *Penguin* and the *Albatross*, each of which will have an armament of at least four heavy guns. The engines of the *Penguin* are very well adapted to naval service, being very compactly arranged and placed entirely below the water line. The upper part of the boiler and the steam dome and steam pipe are, however, exposed and unprotected. On the whole, perhaps, this vessel is more secure than most of the others of its class. On the other hand, the *Albatross*, with a similarly exposed boiler and steam pipe, has engines of the inverted class, so that they are also exposed. If a heavy shot should strike this boat at any point aft the pilot's house, nine chances in ten the engines would be totally disabled, and perhaps the attendant horror of escaping steam would be added to those incident to a bloody engagement. Some means should be taken to protect, as far as possible, those parts of the machinery of those boats which are most exposed. Without such protection they must act entirely on the offensive, as they would quickly be disabled in an engagement if in range of the enemy's cannon.

THE commerce of Portland, Me., does not appear to have fallen off this season. The records at the Custom House show that in May, 1860, the whole number of arrivals from foreign ports was 63; dutiable cargoes 21. For the corresponding month of 1861, the whole number was 73; dutiable cargoes, 40. The foreign clearances in the same month were 65 each.

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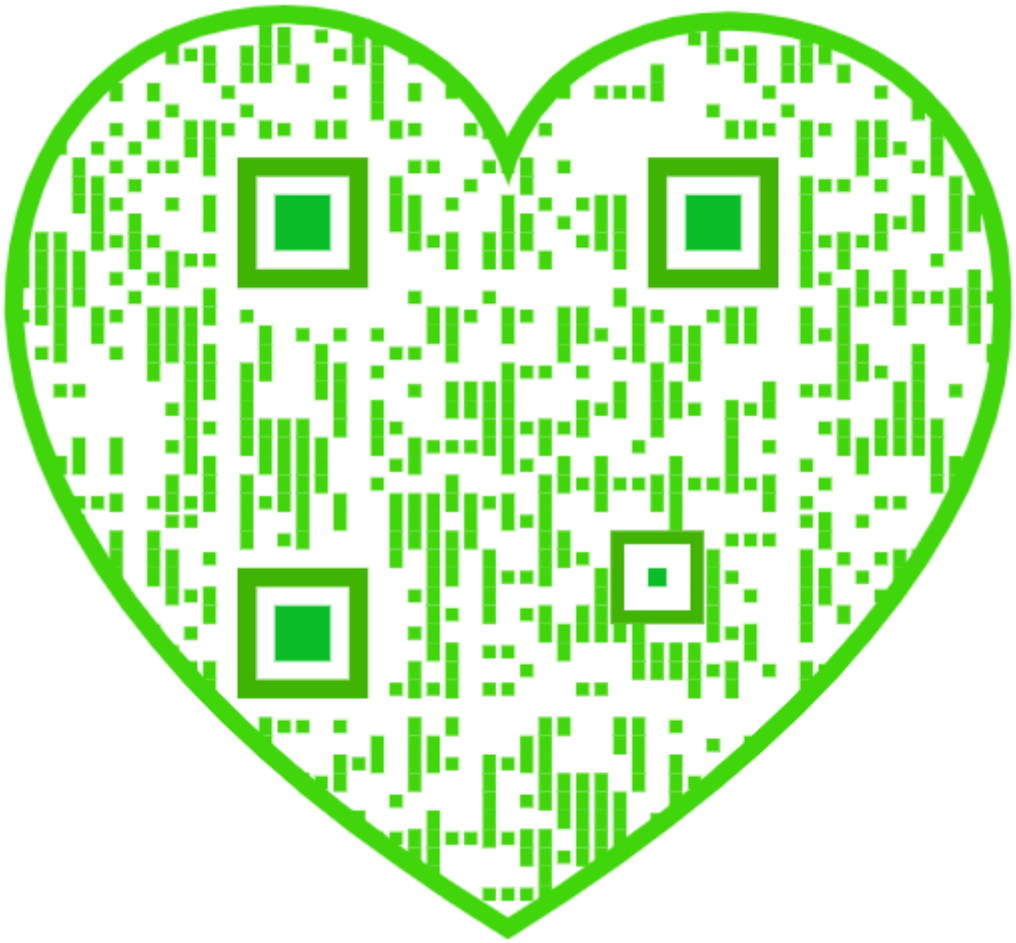

THE WAR.

THE ACCUMULATION OF TROOPS.

The most marked feature in the events of the last week is the steady and rapid movement of troops to the seat of war.

Secretary Cameron said, in a recent speech at Washington, that the available volunteer force in the service of the government amounted to 250,000 men, and that within the space of six months it would amount to 500,000, fully armed and equipped for the war. Since the date of the Secretary's speech, it is said by those who have access to official data that the government forces are now fully 300,000 men.

Federal troops are rapidly concentrating in Virginia. During the last week 13,000 troops reached Washington, and from two to three regiments are daily leaving New York for the seat of war. Major-General McClellan and staff, at the head of 15,000 men, are in western Virginia. Generals Patterson and Cadwallader are in northern Virginia, in the vicinity of Harper's Ferry, with some 20,000 men, and General Scott has now upwards of 60,000 in Washington, while General Butler has from 12,000 to 15,000 at Fortress Monroe.

THE NAVY.

The utmost activity prevails at all the navy yards. At the Brooklyn yard the steam frigate *Roanoke*, 44 guns, is now off the Battery awaiting orders. The gunboats, *Penguin* and *Albatross*, six guns each, are also in commission. The *Savannah*, 26 guns, is ready for sea. A large number of gunboats are also in course of construction. It is supposed that a grand flotilla of these formidable craft will be soon swarming the Mississippi on their way to the Gulf.

SPLENDID OFFER.

Commodore Vanderbilt offers to sell to the government, at a fair valuation, the following steamers :—*Ocean Queen*, 2,802 tuns, new and complete ; the *Ariel*, 1,300 tuns, in fine condition ; the new Iron steamship *Champion*, built in 1859, 1,420 tuns, drawing a very light draught of water, say 7 feet deep light and 12 feet deep laden, carries sufficient coal to carry her 25 days ; the *Daniel Webster*, 1,035 tuns, drawing a light draught of water, say 10 feet, laden. He also offers the splendid steamer *Vanderbilt* on the same terms, and says, if this does not suit, the government will please to accept her as a present.

COMPLETE DESTRUCTION OF HARPER'S FERRY.

In our last issue we gave an account of the partial destruction of Harper's Ferry by the secessionists. We now learn that they returned to the place on the 20th of June, and completed the work of destruction, burnt the rifle factory and the Shenandoah bridge, and run a large first class locomotive that was left on the track off the abutment of the bridge into the river. They said they were instructed to blow up every house in town on which a Union flag should be found. Fortunately there was none. They commenced to arrest all the Union men, and succeeded in securing 11, whom they took off, the balance, about 50 in number, they pursued to the river, into which they swam across to the Maryland shore. They fired at them in the water, but all escaped without a wound, though two of them had balls passed through their hats. They took with them all the gun-stocks, to the number of about 50,000, that were in the rifle factory. Why General Patterson had not marched into Harper's Ferry in time to prevent this destruction is a mystery ; but it was probably owing to some secret information in the possession of General Scott, of which the public will be informed in due time.

OPERATIONS IN MISSOURI.

There seems to be far more energy displayed on both sides in Missouri than any other part of the theater of war. The secessionists are being trampled down by General Lyon with a vigor and celerity that commands the admiration of the whole country. Last week we gave the telegraphic report of the battle of Booneville. We have since received two minute descriptions of the battle, written by two newspaper reporters who were in the engagement, one writing for the Missouri *Democrat*, and the other for the New York *Herald*. By collating these descriptions, we get the following account of

THE BATTLE OF BOONEVILLE.

General Lyon, having frightened Governor Jackson out of the capital, Jefferson City, and taken possession of the place amid the cheers of the loyal portion of its inhabitants, on the 16th of June, pushed on up the river. His forces consisting of about 1,500 Missouri volunteers and a company of artillery belonging to the regular army, were transported on three steamboats, and the next morning they reached a landing eight miles below Booneville, on the south side of the river. Here they fastened to the shore, and the troops were debarked. A farmer at work in a field near the landing stated that the enemy were in camp four and a half miles from that spot, or three and a half miles below Booneville. The level bottom land of the Missouri was here half a mile in width to the bluff, but it gradually narrowed as it extended up the river, until it terminated where the bluff came to the water's edge, two miles from the boat landing. The road followed for a mile and a half along this bottom, and then ascended the bluff. The latter is a range of low hills or ridges, about two hundred feet in hight, which are separated by ravines, some of them with quite precipitous sides. The order of proceeding was as follows :—Ten mounted men, the only cavalry in the expedition, led the advance ; scouting parties, detached from the Second regiment, were thrown out for half a mile on the left and to the river on the right. Two infantry companies followed the cavalry ; then came Captain Totten's battery of artillery, followed by a regiment and a half of volunteers.

At just three minutes before seven A. M., on June 17, the order was given to move. The morning was cloudy, with occasionally a few drops of rain, but before the battle was over the sun shone out clear and bright as ever. As the column ascended the bluff the pickets of the enemy were soon driven in. After an advance of three-fourths of a mile one of the advanced guard rode hastily back to the head of the column and informed General Lyon that the whole body of the State troops was drawn up a few hundred yards in front. General Lyon at once ordered the regulars under Sergeant Griffin to the left, and Captain Schultz's riflemen to the right. Capt. Totten's battery was ordered to the front to occupy the road.

The enemy were drawn up about three hundred yards in advance, on the crest of a hill, or rather a long swell or ridge, over which the road passed at the highest point. The road was occupied by Col. Marmaduke, with a small body of horsemen and a battalion of infantry, while the mass of his troops were in the fields on each side. As soon as our men were in position Capt. Totten unlimbered a twelve-pounder and a six-pounder, and sent a shell from the former into the midst of the men occupying the road. A puff of smoke rising from among them showed that the gunner's aim had been true. The next shell was directed upon the squads of men in the wheat field and caused them to make a hasty retreat. The fire now became general along the whole line ; the regulars on the right, and the German troops on the left, advancing in good order.

In twenty minutes from the time Capt. Totten fired the first shell the rebels were in full retreat, and our men occupying the line first held by the enemy. A house on the right had been completely riddled by the last shots from the battery, and one shell burst in the very center of the building, at a time when it was full of soldiers. Several dead bodies of the rebels were found in the wheat field near the lane, showing that our fire had been effective. In fact, at the first volley from the right wing several saddles were emptied of their riders, and the horses galloped over to our lines. The correspondents of the New York *Herald* and St. Louis *Democrat* entered the battle on foot, by the side of the battery, but were very soon mounted, having succeeded in capturing two of these runaway steeds.

From this point the Union troops proceeded, still in line, for nearly a mile, over ground somewhat uneven, but not rough. In a grove at the entrance to Camp Vest, the rebels made a brief stand, but two shells and a few rounds of Minié balls speedily dispersed them, and they fled in tumultuous haste towards Booneville.

The number of killed and wounded on the part of the rebels has not and probably will not be accurately ascertained.

The number of dead already brought into Booneville, or taken to their friends in the country, cannot fall much short of fifty, and the wounded now heard of are as many more.

On the side of the Union troops, there were three killed, ten wounded and one missing.

We took eighty prisoners, nineteen of whom have been released, and the remaining sixty-one put on board the *Louisiana*. During the engagement, Rev. Wm. A. Pile, of St. Louis, chaplain to the First regiment, was furnished with a detail of four men to look after the wounded. Descending to a ravine, he came suddenly upon a party of twenty-four rebels, and peremptorily ordered them to halt and surrender. They evidently considered discretion the better part of valor, and at once took off their hats and laid down their arms. The parson soon after reported himself to General Lyon with his twenty-four prisoners, guarded by four men and himself.

General Lyon advanced to the edge of the town, halted, and awaited the approach of the Mayor, O'Brien, and several leading citizens. Mr. O'Brien assured General Lyon that there should be no trouble whatever in entering and occupying Booneville, and offered to ride with the commanding officer at the head of the column through the principal streets. His proposition was accepted, and the Union troops entered the town, the people cheering as they passed, and numerous windows showing the Stars and Stripes.

THE PUSH FOR THE LEAD MINES.

The secessionists, after being driven out of Jefferson City and routed at Booneville, marched off in all haste toward the southwest corner of the State, evidently with the purpose of securing the Granby lead mines. At last accounts, the Union forces were also pushing in the same direction by way of the southwest branch of the Pacific Railroad, hoping to arrive first at the mines, and secure them, with the furnaces and machinery.

PROMOTIONS.—Col. Anderson (late Major) the hero of Fort Sumpter, has been promoted to the rank of Brigadier-General. Capt. Doubleday, who served under him, is now a major in the 17th Regiment of Infantry; Lieut Slemmer, the man who saved Fort Pickens, has been promoted to a major.

Miscellaneous Items.

The War Department has got up a commission to ascertain the capacity of the public and private establishment of the country to manufacture army rifled muskets. This is a very judicious movement, and one that ought to have been started months ago. We hope the commission will move rapidly, and avoid all red tapeism. It will be found that our resources for the manufacture of arms are abundant.

The steamer *Bremen*, from Europe, brings 500 cases of rifles and other arms—supposed to be part of General Fremont's consignment. They come ostensibly to several New York importers, but are undoubtedly intended for government purposes. All included, they number about 12,500 stand of arms.

General Butler has been making experiments at the Rip Raps, near Fortress Monroe, with rifled cannon and Sawyer's projectile. The secessionists at Sewall's Point Battery were startled from their lethargy all of a sudden by the whizzing of these missiles within the lines of their entrenchments. One of the balls struck their powder magazine, and it was thought discreet to remove the battery to some other point. The distance fired was over three miles.

On examination of some shells taken from the Washington Navy Yard, it was found that they were filled with sawdust. It is supposed that a considerable number of such shells are out, as a few workmen in the Navy Yard were detected in the act of filling shells in this manner.

The increase of specie is over a million more this week. This is astonishing, considering what a civil war the country is in, and shows our immense resources.

Salt has become very scarce in the Gulf States ; also hay, which is imported into the Gulf States in large quantities from the north. This is an article of prime importance, especially in war times. Powder is also a scarce article. There are Southern manufacturers trying to extract the sulphur from the sulphurous pyrites of North Carolina, but the process is a very tedious and expensive one, and greatly adds to the cost of the powder. Lead is also likely to become scarce, as there are no lead mines in the seceded States. Ink, an important article, also was getting somewhat thick and muddy ; this evil is likely to be remedied, however, as it is gravely announced in a Mississippi paper that the manufacture of ink had been commenced in Charleston, S. C.

CIVILIANS IN THE ARMY.—In our issue of two weeks since, we took ground against the common practice of appointing civilians to important commands in the army over the heads of army officers. We understand the latter are now getting up a petition to the government, praying against the appointment of civilians to high military posts. The following is a paragraph from the document :

> There are one hundred and sixty men, known to eight subscribers of the petition, who have grown gray as lieutenants, nine-tenths of them having averaged seven years in the field. Can the feelings of these men be still when a citizen just appointed demands from them the salute of a subordinate, which he knows not how to return?

Nine gentlemen have resigned since the 28th of May, because they were ordered to serve under persons of no known military skill.

HOW THEY FIRE.—It is a little singular that all inexperienced shooters fire too high, whether with small arms or with big guns. The secessionists at Great Bethel did tremendous destruction to the trees around their batteries, but very little to the Federal troops who, part of the time, were out in the open field where the batteries had a fair shot at them. Most of their guns were aimed too high, and the small number of deaths does not tell favorably for their marksmanship as riflemen. A writer says that one gun was worked well, but the rest were badly managed, their balls cutting off the limbs of trees over the heads of the soldiers. The Federal troops appear to have done the same thing with their small arms, for though they fired by mistake upon each other, they did but little real damage.

THE ARMY TELEGRAPH.—Rogers' patent cordage insulated wire was laid from the Loudon and Hampshire Railroad to General Tyler's head quarters, at Falls Church. Notwithstanding it was run over roads, bushes, creeks and ditches, the wire works admirably. The line was laid under the supervision of Mr. P. Stine Sanderson, of the War Department.

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Naval and Military Movements.

The United States steam corvette *Pensacola* is progressing towards completion at the Washington Navy Yard. She is a new vessel, and has never been at sea. Before the insurrection of the South she was removed from Pensacola to Norfolk, and subsequently from the latter place. Having been for some months on the stocks, the *Pensacola* was launched at the Warrington Navy Yard on the 13th of August, 1858. She was designed by Mr. John Linthall, to whom has been given the designing of the new craft just ordered Her draught of water is 17 feet when loaded ; her tunnage, 2,158. She will carry 18 nine-inch broadside guns. The cut-water and quarter galleries of the vessel are admirable specimens of naval ornamental architecture ; but her distinguishing peculiarity is her capstan, in which a part of the mahogany used by Gen. Jackson during the defence of New Orleans is conspicuously placed. This mahogany was part of an old frame or bed on which a Spanish mortar was mounted by "Old Hickory," in 1814, and which after the declaration of peace, was brought to Pensacola, where it remained for years. The *Pensacola* cost $82,917 42, while the *Richmond*, built at Norfolk, and about the same size, cost $126,816 68. It is the opinion of some who profess to know that the vessel will prove a failure.

Chief-Engineer Isherwood has begun the work of designing the machinery of the new steam vessels of war. He intends to have them supplied with the latest and most approved engines, which, it is said, will be practically tested before being put on board, thereby evading the necessity of ripping up the ships should they not prove successful. Mr. Linthall has decided, we believe, that the vessels will not be built of iron or plated with it.

There is a probability that the decision of the Naval Board, relative to the conversion of line-of-battle ships into steamers, will be carried out immediately. The vessels which passed inspection were the *Ohio*, 84, now at Boston ; the *Vermont*, 84, at Boston ; the *Alabama*, 84, at Portsmouth, N. H. ; the *Virginia*, 84, at Boston ; the *North Carolina*, 84, at New York. It would cost some three millions of dollars to effect the necessary change in these vessels. The *Pennsylvania* and the *New York*, at Norfolk, were recommended, but they will never float again.

The War and Business.

Among a people so absorbed in trade and commerce as those of the Northern States, it is natural, even while carried away by the exciting topics connected with the war, to ask the question—Will business revive? There certainly seems no cause for despondency, either in the present or what is to be expected in the future. It is not the existence of a war that paralyzes trade and commerce, so much as the uncertainty as to what will be the first move, or the result of the first move, towards making the war a permanent thing.

To find a retreat is the first object in time of threatened danger, and our people, as a general thing, carry out this principle in their actual expenses of living ; and this sudden reaction, from reckless extravagance to strict economy, must of course operate, for the time being, unfavorably upon all branches of trade.

In the next place, the peremptory cutting off of markets that have heretofore taken all the surplus of our manufactures and imports, causes a check upon commerce. We stand between two points, the past and the future—the certainty of the one which is gone, and the uncertainty of the future which we are to turn into a certainty.

Philosophers tell us that the smallest amount of material matter cannot be destroyed from the universe without disturbing its equilibrium. The laws of trade and commerce are as immutable as those of nature. What is stopped in one place must find an outlet in another ; nothing is utterly destroyed.

After Congress has assembled, and the policy of the government becomes distinct in all its parts, we have faith to believe that confidence will be restored. If it is to be war for an indefinite period, we shall shape our business operations to meet such an exigency. If we are to have peace within a reasonable time, then matters will take care of themselves.

We believe the policy of European governments toward our own will be shaped, in a great degree, by the actions of the next Congress, which they recognize as the power that legalizes the acts of the administration. Once let them maintain strict neutrality, and refuse to countenance any attempt to subvert the legitimate objects of our government, and we have nothing to fear from the piratical crews of Southern privateers.

It is within the power of the government to open such friendly relations with Spain as shall fling the markets of Cuba entirely into the hands of Northern producers, and this alone will more than compensate for the loss of Southern trade. There, too, is Central America, Mexico, and other points that have been too much neglected by American enterprise, that will afford ample scope for our manufacturers and producers. Experience in the past few years has shown how important a relation the wheat fields of the West bear to the subsistence of Europeans, and there can be little doubt that the exports of 1861 will far exceed those of previous years.

On the whole, we see far more of encouragement than despondency in the present aspect of affairs and in the future prospects.—*Boston Commercial Bulletin.*

The French Ambulance System.

A number of medical gentlemen met lately in this city to discuss the medical equipments necessary for an army. Drawings were produced of an ambulance made after the latest pattern used in the French army in Algeria and the Crimea. This ambulance is an omnibus shaped vehicle, to be drawn by two or more horses, weighing some twelve hundred pounds, but constructed in such a manner that it may be easily detached, separated in several pieces in the interior, the most important portion easily carried by several men. The interior is, when fully standing, a row of beds, carrying six or eight men, with great ease, but when crowded, may be forced to transport three times that number. Each bed is a "field stretcher" or portable cot, which takes the wounded man from the field, and without any fatiguing change places him in this portable hospital. An india-rubber bath is also attached.

The ambulance system is the result of Napoleon's great surgeon, Larrey. It has been found that soldiers volunteered more freely, exposed their bodies with less thought, when they knew that there was an effective medical corps to attend in case of accident or injury. What if they received a ball or a bayonet thrust—pain, to be sure, for which they cared little—but their surgeon could extract it, and in a few weeks or months they were well, and it was distinction ever after. With an effective ambulance, they would undertake any march, knowing that, if overfatigued, there they would be received, and not left on the road, to be killed by any thieving camp follower.

Dr. Wolff, late Staff Surgeon in the Portuguese army, said that the duties of an army surgeon were to see that none entered the service unless able-bodied. Every sick man requires three or four to carry and attend him. He could prove that regiments had left the city with a very large proportion constitutionally debilitated, and whom but a little exposure or overfatigue would make sick men, requiring care from the others, and thus materially weakening the efficiency of the corps. A great part of the mortality is caused by disease, and not by bullets. A surgeon in the French army may say, "Colonel, these troops are fatigued and cannot march further," and the result is, that a stop is made, and the camp pitched where they are. He did not know whether this was so in the American army or not, but it should be so.

The great enemy to be feared was not the one who came with powder and ball, but disease—hospital dysentery—always of a typhoid character, contagious in some degree.

CONTRACTS AWARDED.—The following contracts have been awarded by the Military Board of this State:—5,000 cartridges boxes, to Sproulls, Meeker & Co.; 5,000 cartridge box belts and plates, Andrew J. Phillips ; bayonet scabbards and frogs, Joseph Van Cleve, of Newark, N. J.; 5,000 cap pouches and picks, and 5,000 waist belts and plates, Andrew J. Phillips; 5,000 gun slings, P. Jewell & Sons ; 5,000 haversacks and 5,000 knapsacks, Peddie & Morrison ; 500 hatchets, Ralph P. Lathrop ; 1,500 camp kettles and 3,000 messpans, J. H. Atwater & Co.; tents, Hemminway & Beveridge, New York.

Defences of Mobile.

Wm. H. Russell, correspondent of the London *Times*, in a recent letter to that journal, gives the following interesting account of the harbor and defences of Mobile :—

The waters of two rivers fall into the head of the Bay of Mobile, which is, in fact, a narrow sea creek between low sandy banks, covered with pine and forest trees, broken here and there into islands, and extending some thirty miles inland, with a breadth varying from three to seven miles. No attempt has been made apparently to improve the waters or to provide docks or wharfage for the numerous cotton ships which lie out at the mouth of the bay, more than twenty-five miles from Mobile. All the cotton has to be sent down to them in lighters, and the number of men thus employed in the cotton season in loading the barges, navigating and transferring the cargoes to the ships is very considerable, and their rate of wages is high.

The horror entertained by a merchant captain of the shore is well known, and the skippers are delighted at an anchorage so far from land, which at the same time detains the crews in the ships and prevents absenteeism and "running." At present there are but seven ships at the anchorage, nearly all British, and one of the latter appears in the distance hard and fast ashore, though whether she got there in consequence of the lights not being burned or from neglect, it is impossible to say. Fort Gaines, on the right bank of the channel, near the entrance, is an unfinished shell of a fort which was commenced by the United States Engineers some time ago, and which would not be easy to finish without a large outlay of money and labor. It is not well placed to resist either a land attack or an assault by boats.

A high sandbank in front of one of the fasces screens the fire, and a wood on another side, if occupied by riflemen, would render it difficult to work the barbette guns. It is not likely, however, that the fort will be attacked. The channel it commands is only fit for light vessels. From this fort to the other side of the channel, where Fort Morgan stands, the distance is over three miles, and the deep water channel is close to the latter fort. The position at Gaines is held by a strong body of Alabama troops—stout, sturdy men, who have volunteered from farm, field or desk. They are armed with ordinary muskets of the old patterns, and their uniform is by no means uniform; but the men look fit for service. The fort would take a garrison of five hundred men if fully mounted, but the parapets are mere partition walls of brickwork crenellated ; the bombproofs are unfinished, and, but for a few guns mounted on the sandhills, the place is a defenceless shell-trap. There are no guns in the casemates, and there is no position ready to bear the weight of a gun in barbette.

The guns which are on the beach are protected by sandbag traverses, and are more formidable than the whole fortress. The steamer proceeded across the channel to Fort Morgan, which is a work of considerabie importance, and is assuming a formidable character under the superintendence of Colonel Hardee, formerly of the United States Army. It has a regular trace, bastion and curtain, with a dry ditch and drawbridge, well-made casemates and bombproofs, and a tolerable armament of columbiads, forty-two and thirty-two pounders, a few ten-inch mortars, and light guns in the internal works at the salients. The store of ammunition seems ample. Some of the fuses are antiquated, and the gun carriages are old fashioned. The open parade and the unprotected gorges of the casemates would render the work extremely unpleasant under a shell fire, and the buildings and barracks insides are at present open to the influences of heat. The magazines are badly traversed and inadequately protected. A very simple and apparently effective contrivance for dispensing with the use of the sabot in shells was shown to me by Colonel Maury, the inventor. It consists of two circular grummets of rope, one at the base and the other at the upper circumference of the shell, made by a simple machinery to fit tightly the sphere, and bound together by thin copper wire. The grummets fit the bore of the gun exactly and act as wads, allowing the base of the shelf to rest in close contact with the charge, and breaking into oakum on leaving the muzzle.

Those who know what mischief can be done by the fragments of the sabot when fired over the heads of troops will appreciate this simple invention, which is said to give increased range to the horizontal shell. There must be about sixty guns in this work; it is overgarrisoned, and, indeed, it seems to be the difficulty here to know what to do with the home volunteers. Rope mantlets are used on the breeches of some of the barbette guns. At night the harbor is in perfect darkness. Notwithstanding the defences I have indicated, it would be quite possible to take Fort Morgan with a moderate force well supplied with the means of vertical fire.

MOUNTED ARTILLERY.—Why may not a regiment of mounted artillery be organized upon the principle of each soldier being furnished with a 1-pounder rifled musketoon, mounted upon a swivel, capable of being swung from side to side upon the curb of the saddle? Such a corps would be a genuine "flying artillery." Small rifled cannon could be made to have a great range—two miles at least. Such flying artillery would be terrible as skirmishers. Their movements would be so rapid, that they could choose their positions with impunity.

THREE thousand additional troops are to be sent out from England to Canada. The *Great Eastern* has been chartered to carry them to Quebec. For several years past there have been very few British soldiers in Canada.

DURING the first months of the present year the British importations of foreign breadstuffs amounted to ninety millions of dollars. In 1860, for the same period, they were but twenty-two millions five hundred thousand.

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The Privateer Savannah.

The first of the vessels that were tempted to engage in piracy under Jefferson Davis' letters of marque and offers of head money, is now lying in the harbor of New York, and her crew are safely locked up in our city prison, and are awaiting their trial for piracy. In our last number we gave a minute account of her capture, and we now present an accurate engraving of the vessel as she appeared while lying off the Battery.

The *Savannah* is a pilot boat of 55 tuns, and is said to have belonged to one McDonald, a pilot, formerly in the employ of Spofford, Tileston & Co.'s line. She had, when captured, an 18-pounder amid-ships on a swivel, and plenty of small arms, such as muskets, sabers, pistols, dirks, bayonets, &c., with a full magazine, and provisions and water for a two weeks' cruise.

It will be remembered that she took a Maine vessel soon after leaving port, and succeeded in sending her into Georgetown, S. C. She then saw the United States brig-of-war *Perry*, and sailed for her, taking her to be a merchantman. Instead of capturing the *Perry*, however, the *Perry* captured her, and the crew are now in prospect of a speedy trial.

The captain of the *Savannah* calls himself T. Harrison Baker. He says that he was born in Philadelphia, and is now 37 years old. He is a tall, full-bearded, by no means repulsive looking man, and was neatly dressed in a suit of blue flannel. He has lived in Charleston for a long time, and has "followed the sea" more or less for the past fifteen years. His crew were generally shipped by an agent and sent on board. He knew a few of the men, and the best of them were sent in with the first and only prize captured—the brig *Joseph*, from Cardenas.

John Harleston is the first officer. He is a South Carolina man, twenty-eight years old, and says he is not a sailor; nor does he look like one, but appears, as he says, like a man brought up in business—a delicate-handed, rather gentlemanly-looking man.

The sailing master, Henry C. Howland, is a North Carolina man, twenty-eight years old, and a sailor.

The purser, C. S. Passailaigue, is a young South Carolinian, "only nineteen years old," a decidedly good-looking, well-behaved young fellow, who has been a mailing clerk and assistant book-keeper in the Charleston *Mercury* office. This is his first, and it is safe to say last, cruise as purser of a privateer.

The general appearance of these four men was favorable. They had nothing of the desperate or even rowdy look that would naturally attach to men in their profession. The officers of the *Lane* spoke of them as quiet and well behaved, and the prisoners desired to return their grateful thanks for the kindness extended to them by the officers both of the *Perry* and the *Harriet Lane*.

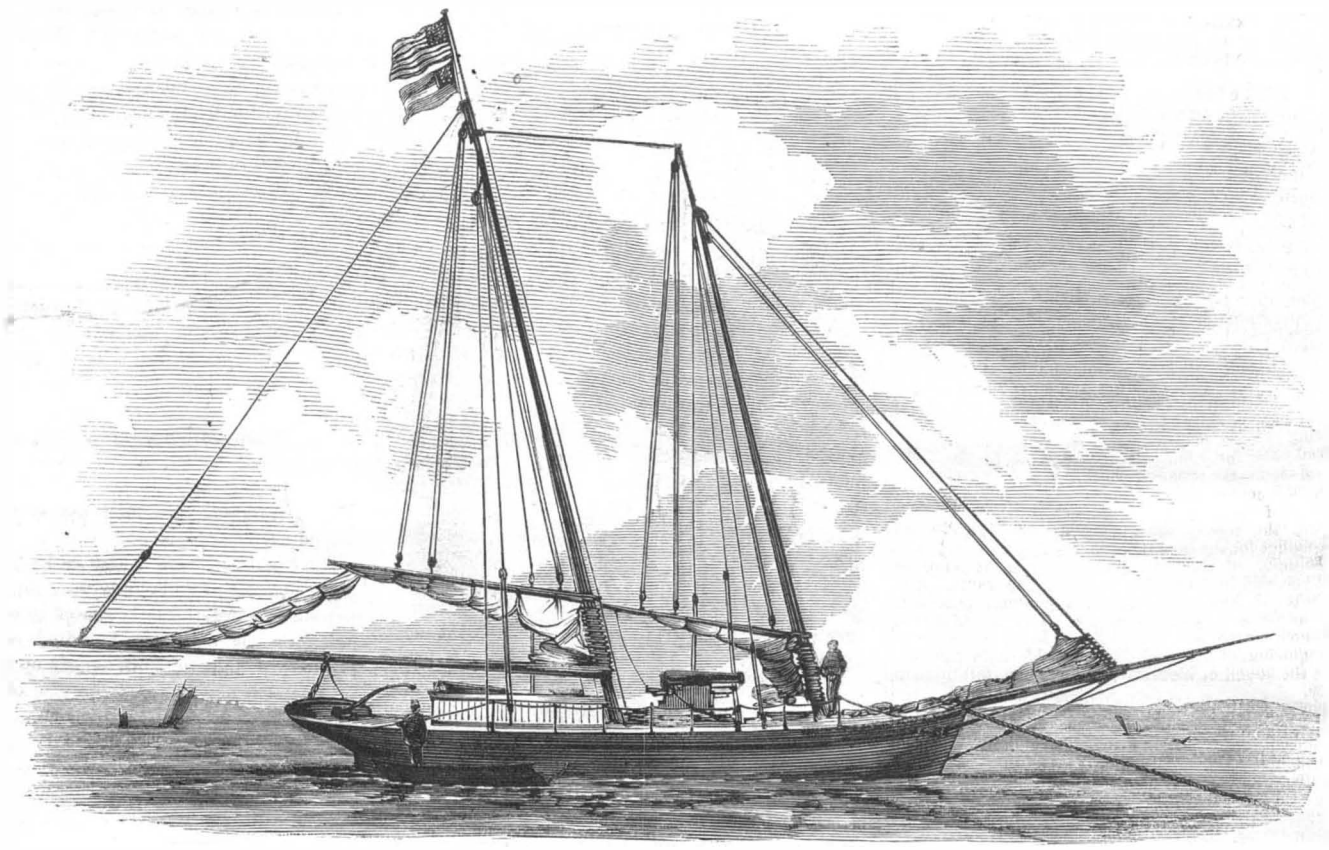
The nine men of the crew brought to this port are "a hard-looking set"—the national descriptive phrase applied to them by all on board the *Lane*—and despicable rather than desperate. Nor did their captain have a very exalted opinion of their seamanship or courage.

They are very ordinary men, few of them being sailors, and not one of them Southerners. Their names and nationalities, as given by themselves, are as follows :—

	Nativity.	Profession.	Age.
A. G. Farris,	Massachusetts.	Sailor.	50
Patrick Daly,	Irish.	Laborer.	26
John Murphy,	do	Sailor.	29
Martin Galvey,	do	Laborer.	30
W. C. Clark,	German.	Sailor.	42
Alex. C. Coid,	Scotch.	do	40
Richard Palmer,	do	do	37
Jose Cruz del Cano,	Manilla.	Steward.	30
Enteleomi,	China.	Cook.	37

Those who claim to be "sailors" look generally as little like seamen as hod-carrying landsmen possibly can do. The Chinaman and the Manilla man were the most intelligent of the crowd.

Considerable interest prevails in the public mind respecting the result of this trial, and many intricate law questions are likely to arise. It is supposed that these men belong to several nationalities, and should they claim the protection of their respective governments, this matter would become much more complex.



THE PRIVATEER SAVANNAH.

Temporary deafness, arising from cold, sitting in a draught, and other causes, may be relieved and cured by letting fall into the ear ten drops of a mixture of sweet oil and one of glycerine every night, until the duct which leads from the ear to the nose is cleared; this will be known by the sensation of the fluid passing at once from the ear into the nostril. If, from inattention, the wax becomes hardened, and thus also induce temporary deafness, then the above mixture is to be applied for two or three days, and followed by thoroughly washing the ear with soap and warm water. No hard probe or pick is to be put into the ear on any account, as it is very liable to injure the membrane.—*Septimus Piesse.*

In the description of Phillips' Carriage Spring, on page 392, last volume, it is inadvertantly stated that the patent was secured through this office. Such is not the fact, and we are happy to make the correction.

British Steamboat Racing.

In England horse racing is a great national institution. It is supported by all the nobility, and patronized by the great majority of the people. In Scotland, on the other hand, steamboat racing is almost a national pastime. On the river Clyde, there are quite a number of rival steamboat builders who are continually endeavoring to surpass one another in the speed of their boats. Every builder endeavors to make some improvement in his latest constructed boat, by which he may be able to beat his opponent in a race, even if it is but a few minutes in a contest between Glasgow and Rothsay—a distance of 50 miles, partly on the river and partly on the sea. When two or more new boats are finished about the same time, by diffcrent builders, a most intense excitement prevails in the community, as races always take place between them in their early trips. Parties arrange themselves on different sides, and betting goes on about the steamboats in the very same manner as it does about horses in other parts of the world. Three new river steamboats—the *Rothsay Castle*, the *Ruby*, and the *Neptune* have lately had several races on the river Clyde, in which they have generally made the run of 50 miles in from two hours and twenty-six minutes to two hours and thirty minutes—a speed of about 20 miles per hour. This is pretty fast, but not within eight miles an hour of American fast river boats.

The Drummond Light.

We announced some time since that Professor Grant had been employed by the government to erect one of his powerful calcium lights at Fortress Monroe, in order to shed light upon any nocturnal schemes that might be undertaken in that quarter. This is the most brilliant of all artificial lights, and will serve as a valuable agent even in war.

An improvement in the arrangement of the lime-points has lately been patented by Prosser & Stanley, of London, for increasing the intensity of this light. It consists in arranging two lime-points opposite one another, toward the jets of flame, and they are made to converge toward a common center by being gradually pressed forward with a spring or a weight, to keep the points in contact when the flame impinges upon them. These lime cones are retained in tubes, and a fresh surface is continually presented to the action of the ignited gases.

The calcium light consists of a fine stream of hydrogen and another of oxygen gas, carefully brought into contact and burned upon a piece of purified lime —fine chalk.

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Working in Aluminum.

We find the following valuable article in the *Ironmonger* (English). The information was obtained from Messrs. Bell & Brothers, of Newcastle-on-Tyne, manufacturers of aluminum, by Professor Deville's process, and will be very useful to many of our readers:—

The peculiar properties of this substance having been so little understood, has hitherto hindered its general employment, but now that it is sold in a pure state at as low a rate as 50s. per pound avoirdupois, it is likely to be much more frequently used.

Aluminum is a metal of fine white color, slightly inclining to blue, especially after being well hammered when cold.

Aluminum, like silver, is susceptible of a very fine "matting," which is not affected by exposure to the air, or by any of the impurities usually present in the atmosphere of towns. To obtain this matting, the aluminum objects (being previously washed in benzole or essence of turpentine) must be plunged into a weak solution of caustic soda, thoroughly well washed, and exposed to the action of strong nitric acid. When the desired matting has been obtained, it must be well washed again, and dried in sawdust.

Aluminum is easily polished or burnished. To do this, it is necessary to use a mixture of equal parts of rum and olive oil, as an intermediate substance between it and the polishing stone or powder used. The polishing stone steeped in this mixture, and will then burnish aluminum in the same manner as gold and silver is burnished, care being taken not to press too heavily upon the burnishing instrument.

Aluminum can be beaten out, either hot or cold, to the same extent and as perfectly as gold or silver; and it is susceptible of being rolled in much the same way as either of the above metals. Leaves as thin as those used for gilding and silvering can be made of aluminum. Covered ingot molds of iron answer best for receiving aluminum intended to be used in the rolling mill. Aluminum quickly loses its temper, and therefore requires frequent reheating. The temperature of this reheating is a dull red heat, and when the plates become very thin, this demands the greatest attention.

Aluminum is easily drawn into wire. For this, the ingots are run into an open mold, so as to form a kind of quadrangular shape of a little less than half-inch section, which is then beaten upon the edges by the hammer very regularly; the operation of drawing out is then commenced on a horizontal bench, by very gradually reducing the diameter of the metal intended to be drawn into wire, and, by frequent reheating, and then the ordinary process of wire-drawing can be proceeded with. When the threads are required extremely fine—as, for example, for the manufacture of lace—the heating becomes a very delicate operation, on account of the fineness of the threads and the fusibility of the metal. The heat of the current of air issuing from the top of the glass chimney of an Argand lamp will suffice for the heating.

The elasticity of aluminum is very much the same as that of silver, and its tenacity also about the same. The moment after it has been melted, aluminum possesses about the hardness of pure silver; when it is hammered out, it almost resembles that of soft iron; it becomes elastic, acquiring, at the same time, considerable rigidity, and emits the sound of steel when suffered to fall upon a hard body.

A property which aluminum manifests in a high degree is that of excessive sonorousness. This property has already rendered it of service in the construction of several musical instruments.

Aluminum is much lighter than ordinary metals. Its density is 2.56, a quarter that of silver, and about a third that of iron. By the action of the hammer, the density of aluminum increases sensibly, so as to become equal to 2.67.

Aluminum melts at a higher temperature than zinc, and a lower one than silver; to melt it, an ordinary earthenware crucible must be employed, without the addition of any sort of flux.

Its low point of fusion, along with its slowness of heating, require that for melting it a less intense fire should be used, but applied for a longer time than in melting silver.

It is easily melted in an open crucible, which facilitates the removal of the dust and other impurities which appear on the surface of the metal; and for the purpose of stirring the entire mass a clean iron spatula is used.

Aluminum is easily run into metallic molds; and, still better, for objects of a complicated form, into molds of dry porous sand, formed so as to allow an easy passage for the air expelled by the metal, which is viscous when melted. It ought to contain a greater number of passage holes, and should be so managed as to run it in one long and perfectly cylindrical git. When heated to a red heat, it ought to be poured out with tolerable rapidity. A small portion of the fused metal should be caused to run into the git itself when full, to compensate for the contraction of the substance of the metal at the moment of solidification.

By following all these precautions, castings of the highest degree of fineness may be obtained; but, at the same time, to succeed perfectly, an especial acquaintance with the subject is needed.

In the production of work where the use of the lathe becomes necessary, any scratching or tearing of the metal by the tool is avoided by covering the surface to which the tool is applied with a varnish composed of stearic acid and essence of turpentine.

When aluminum is soiled by greasy matters, it can be cleaned by benzole; if it be soiled by dust only, india-rubber or very weak soap and water may be used.

The pieces of aluminum intended to be soldered must be prepared in the same manner as objects are treated for soldering with tin, viz., by a "tinning;" but it must be remembered that it is indispensable that this tinning must take place with the solder itself. The pieces to be soldered, thus tinned beforehand, are afterward joined together and exposed to the flame either of a gas blowpipe, or any of the ordinary sources of heat used in such cases. In order to unite the solderings, small tools of aluminum are used. These tools are used as little soldering instruments, and they facilitate at the same time the fusion of the solder and its adhesion to the previously prepared aluminum.

The use of tools of copper or brass used when soldering gold and silver, must be strictly avoided, as they would form colored alloys with the aluminum and the solder. It is of the greatest importance never to use any flux to cause the solder to melt, as all those at present known attack aluminum, and prevent the adhesion of the pieces to be soldered. The use of the little tools of aluminum is an art which the workmen must acquire by practice; in fact, at the moment of fusion the solderings must have the friction applied, as they melt suddenly in a complete manner. In soldering aluminum, it is well to have both hands free, and to use only the foot for the blowing apparatus.

Solders of different compositions and degrees of fusibility have been employed in soldering aluminum. The following are those which have been generally used, ranged according to their order of fusibility:—

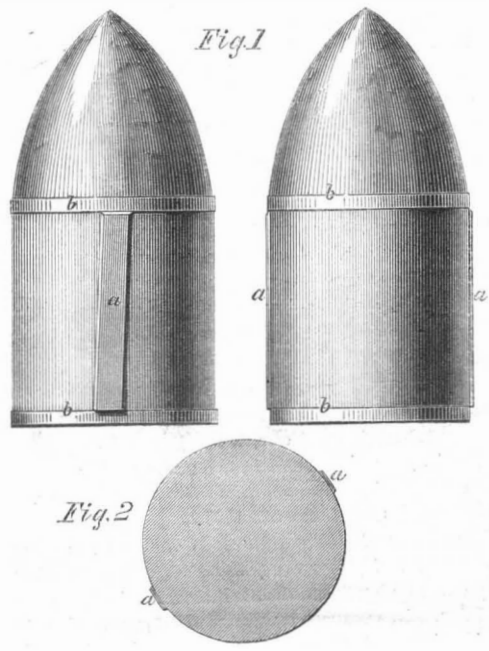
	1.	2.	3.	4.	5.
Zinc	80	85	88	90	94
Copper	8	6	5	4	2
Aluminum	12	9	7	6	4

No. 4 is the one usually preferred, particularly for soldering smaller objects.

In order to make the solder, the copper is first melted, the necessary aluminum is added, and stirred by means of an iron spatula, unpolished, as it comes from the blacksmith, adding also a little tallow; the zinc is then added, avoiding too much heat, as this last metal is easily oxydized and is very volatile.

SIGOURNEY'S PROJECTILE.

A projectile for rifled cannon which possesses the merits of simplicity and strength, with no liability to get out of order when needed in the hour of battle, and which would at the same time give the accuracy and range due to that kind of arm, is considered by military men a desideratum. Cast iron is not only the best but the cheapest material for the purpose; but there has been an objection to its use, for the



casting could not be made with sufficient accuracy to fit the bore and grooves with the necessary precision; besides, the grooves were liable to serious abrasion. These objections seem to be overcome by Mr. Sigourney's improvement, represented in the accompanying engravings. Figs. 1 and 2 are side views, and fig. 3 is a section of the bore and grooves, showing the relative depth and form of the latter. The proper depth for these in a 24-pounder bore would be two-tenths of an inch; that for lesser calibers proportionately less. It will be seen that the projectile is of the usual cylindro-conoidal form, and is cast in one mass, the improvement consisting in so constructing the cylindrical part that those portions only which are finished come in contact with the bore and grooves. The belts, *b b*, project slightly above the main body of the projectile, and are cast sufficiently large that they can be turned down to any required fit or degree of windage. When this is once established it will be constant in all. The windage may be closed by the employment of a cup-shaped wad, which will expand the same as the rear of a Minié ball. It may be attached to the cartridge or run down the gun separately, and being greased will lubricate the bore and grooves. The flanges, *a a*, are cast enough larger in thin section that they can be finished to the proper size to fit the grooves. This is done by machinery devised for the purpose, and the flanges receive precisely the same spiral or twist as the grooves. This construction and manner of finishing obviates the danger of abrading the grooves, as a gun now at Fortress Munroe, which has been fired about 250 times, testifies. This gun, which is a 42-pounder, was made by the government for experimental purposes, and has been tested by the board of officers appointed for the purpose of making trials with rifled cannon; and the experiments were to be continued the present season but for the occurrence of the war. The report of the board upon the experiments made last season at Fortress Munroe was more favorable to the plan of Mr. Sigourney than to any other.

The advantages claimed for this projectile are its simplicity, strength and cheapness, while it secures accuracy and range sufficient for all practical purposes, that it cannot be injured by handling or transportation, and that it will not deteriorate by storage. As a shell, it can be fitted with percussion or time fuses, and as a solid shot it can be fired red-hot.

There have been so many difficulties and derangements attending the use in actual warfare of guns and projectiles of complicated construction, where extremely nice accuracy and great range have been sought to be obtained, that it has become a serious question in military circles whether practicability has not been sacrificed to obtain them. Plenty of evidence of this will be found in the recent numbers of the Scientific American. The French and Sardinian systems, on the contrary, are extremely simple, and have proved entirely effective in actual warfare. Mr. Sigourney's plan is considered, by competent military authorities, an improvement upon these.

The patent for this invention was granted March 3, 1857. Further information may be obtained by addressing the inventor, John M. Sigourney, at Watertown, N. Y.

Taking in Powder.

This indispensable element of warfare needs careful watching, as the moment it gets the upper hand, damage is sure to be done. When a war vessel takes in powder she carries a red flag at her mast head. All fires and lights are put out in the ship at this time, and all hands must have a cold dinner; nothing can be cooked even for the officers. The custom generally is to cook enough the day before the magazine is opened.

The frigate *Colorado*, which sailed from Boston a few days since on blockade duty, took about fifty thousand pounds of powder. It is placed in copper tanks, and each tank has from one hundred and fifty to two hundred pounds in it, all made up into cartridges. Each tank is marked with the size of the gun or cartridges, and each gun has three or four different sized cartridges, the largest being for the first charge. As the gun gets warm a smaller size is used, and so on down to the smallest. Near the entrance to the magazine is what is called a lighthouse. A large lantern is here arranged with a sort of bull's eye, which throws a light into the magazine. While the powder is being carried in, a man is here stationed with a bucket of water prepared to use it in case anything should happen to the lantern. The utmost care is used to prevent accident.

Extra Dry Clothes for Soldiers.—An English writer on the dress of soldiers, says:—"The soldier should have a loose woolen wrapper to serve as a change when campaigning. The value of dry clothes, when he lies down on the bare ground, after a fatigueing march, is not to be overrated. The skin's debility is malaria's opportunity. The germs of fever, dysentery and cholera, stalking over the bodies of a sleeping army which has been exposed to the sun by day, quickly scent out the enfeebled skins, and divide the prey."

Whitworth and Armstrong Guns.—The London *Mechanics' Magazine*, of May 31st, says of the gun of Sir William Armstrong:—"It has been proved to be inferior to others, by the late trials at Shoeburyness. The Armstrong and Whitworth cannon have, within the past few days, been matched against each other, and after a fair trial, the Whitworth has been proved to be superior in accuracy and range."

Photographs of War Prisoners.—The question is asked, "why don't our officers in service take a cheap photograph of those prisoners who are allowed to depart on taking the oath of allegiance?" They might be reproduced for the use of every division of our army, and put into book form, furnishing the best possible proof for hanging those caught in arms against the government the second time.

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Correspondence

LETTER FROM OUR WASHINGTON HOUSE.

WASHINGTON, June 24, 1861.

MESSRS. EDITORS:—In connection with the ordnance cartridge to which I referred last week, I should have stated that it gives practical value to an invention of three years' standing, which would otherwise have been of much less importance. This is a muzzle-loading cannon patented in 1858, which performs the successive operations of loading, capping, firing and swabbing without requiring the attendant to approach the muzzle, or otherwise expose himself to the enemy's fire. The cartridges are fed into a hopper, much as apples are fed into a grinding mill. What this invention particularly lacked was some de vice to remove the metal cartridge case, which want is now supplied.

I notice, among the patents granted this year, one issued on the 26th of March, to C. A. McEvoy, of Richmond, Va., for an improvement in loading fire-arms. It consists in the use of a flanged metallic casing, formed to slip into the muzzle of the piece, and so constructed that the entire charge may be driven through the casing into the barrel by the simple application of the ramrod. It is cheap and effective, entirely waterproof, and very quickly and conveniently applied, requiring no previous manipulation to open the cartridge. It is generally understood here that the inventor of this improvement is at the present time in open and active rebellion against the government which granted him a patent, and also that the invention has been brought into successful use in the ranks of the rebel army. It certainly facilitates the loading of both large and small arms to a great degree, and many loyal men desire to see it introduced among our troops, holding that the government would be justified in using the invention of any man who has outlawed himself by aiding her enemies.

The following regiments have arrived here during the last week:—Michigan 3d, Massachusetts 1st, Pennsylvania 24th, 26th, New York 21st, 14th, 18th, 38th, 26th, 29th and 17th; Maine 4th, Rhode Island 2d, and New Hampshire 2d, numbering upwards of thirteen thousand men, rank and file. At no time since the commencement of the war have troops arrived as rapidly as now, and they are passing forward into Virginia in great numbers; but all is now done without unnecessary stir or excitement, nothing being known of such movements until they are actually accomplished.

Professor Lowe has made several largely successful experiments with his balloon, which is designed for reconnoitring the enemy's forces and works. It has now been removed across the river, and would have been brought into use yesterday but a high wind prevented.

Two pieces of "contraband property" entered the lines of the Second Michigan regiment on the Virginia side of the Little Falls yesterday, saying that their masters having left home to join the secession army, they had concluded to link their forces with that of the United States. They were allowed to remain, and went cheerfully to work. Such incidents as this are constantly occurring in those parts of the enemy's country occupied by our troops, but the most scrupulous respect is paid to the ownership of all loyal citizens in this species of property, and no such escapes are permitted excepting in localities in open rebellion against the government.

Invention of the Baltimore Steam Gun.

MESSRS. EDITORS:—Allow me, as an inventor, to set the public right, through your paper, as to the centrifugal gun called the "Winans" or "Dickinson gun."

I am its inventor. I have been to work at it for more than twelve years past, and obtained Letters Patent for it May 17, 1859, which you will find noticed on page 385 of the report of that year. Dickinson, who claims to be the inventor of this gun, derived the invention from me.

As much has been said in relation to this gun, it is due to the public and myself to give my views and correct false impressions in relation to it. I wish first to make a few remarks upon an article in your paper of June 15th, headed "Absurdity of Steam and Centrifugal Guns." I never intended to use steam in field operations. The estimated power required to throw balls, as stated, is not correct in relation to my centrifugal gun, but is correct in relation to powder guns. With my invention, the balls start with a very slow motion, and increase until they reach the end of the barrel; this requires but little more power to project 300 balls per minute than it requires to keep up the motion of the machine. But not so with guns for powder. The ignition and expansion of powder is almost instantaneous, and must of necessity require very many more times the power than an accelerated motion. I can apply my own strength to a machine by means of a crank, and, by degrees, get up a motion equal to the best rifled balls; but to get up this motion instantaneously would require the power of several hundred men. With an imperfect machine, I have thrown, with my own strength, an ounce ball through an inch pine board at a few yards distance; and to apply the powers of ten men, balls can be thrown equal to gunpowder, at the rate of 500 per minute.

I have been acquainted for twenty-five years past with most of the plans of centrifugal guns, but my invention is upon a different plan from them all; and to apply steam to the McCarty gun, it would not be like my invention, or the Baltimore gun, as described by the New York *Tribune* of May 1st. I can, without fear of failure, build a machine that will do more execution with the aid of twenty men, without steam, than a thousand men can do with rifles or muskets; and when centrifugal force is successfully applied to war, it will be upon the plan of my invention.

The difficulty with centrifugal guns is an inaccurate discharge or great waste of balls; this was the case with the Reynolds gun, the Potts gun, and also with the Baltimore gun. After the issue of my patent, Dickinson obtained a patent for what he called an improvement, which is an absolute damage to the machine, and balls can never be discharged correctly with it. My invention for discharging will put all the balls in a very small space, the discharge being instantaneous at the same point every time. I am not foolish enough to think my gun will take the place of all others; but, introduced in the proper place with the other great engines of war, it would be of very great service to the government in the present crisis.

WM. JOSLIN.

Cleveland, Ohio, June 17, 1861.

[An engine of 60 horse-power is one that can exert this amount of power every minute, and not one that may exert 60 horse-power at intervals of five or ten minutes. In comparing steam with gunpowder, in discharging shot, the rapidity with which each can be discharged for several hours (not minutes) should always be taken into consideration. A 10-horse power engine, as usually constructed, would break down by attempting to work it up to 60 horse-power, because the parts are always proportioned in strength to the work which the engine has to perform.—EDS.

Protecting Ships with Iron Rails.

MESSRS. EDITORS:—I am disposed to think that a better protection for ships against cannon shot than plates of steel or iron would be railroad bars of considerable depth, spiked lengthwise at such distance apart as to not permit a ball to enter between them, and braced at intervals to prevent tilting.

The advantages would be the saving of metal and weight, as not more than one-third of the surface would be covered, the ease of application and renewal, and the diminished resistance to the water.

I merely submit the idea as one that may be of service in that line. Yours, respectfully, A.

Lambertville, N. J., June 4, 1861.

Rifling Smooth Cannon.

MESSRS. EDITORS:—In your issue of June 1st, I saw an article on rifling old smooth bore cannon—such as are in good condition. Guns that are not in the most perfect condition may be made so at any ordinary machine shop where there is water or steam power, and at very moderate expense. I think any 8 or 9-pound gun may be reamed out within six hours after it is in position, and the diameter of the bore will not be increased to exceed one-eighth of an inch, so that the strength of the gun will be reduced but little.

There is at this time no work to be done in any of the shops where cotton and woolen machinery is built, and there is any number of good workmen ready to go to work immediately, and, with the railroad facilities we have for transportation, we can ream and rifle every gun in possession of the government in 90 days.

H. H. P.

Port Jervis, N. J., June 7, 1861.

Grand National Exhibition and Test of Firearms.

ROOMS OF THE ILLINOIS STATE AGRICULTURAL SOCIETY, Springfield, June, 1861.

The Executive Committee of the Illinois States Agricultural Society have determined to add the following to their regular list of premiums, to be competed for during their annual exhibition for 1861, at Chicago, September 9th, 10th, 11th, 12th, 13th and 14th:—

For the best breech-loading rifle cannon, 12-pounder	Grand gold medal.
For the best breech-loading rifle cannon, 6-pounder	Grand gold medal.
For the best muzzle-loading rifle cannon, 12-pounder	Grand gold medal.
For the best muzzle-loading rifle cannon, 6-pounder	Grand gold medal.
For the best breech-loading rifle for infantry service	Gold medal.
For the best rifle musket for infantry service	Gold medal.
For the best breech-loading carbine for cavalry service	Gold medal.
For the best revolving pistol for cavalry service	Gold medal.
For the best target rifle	Silver medal.
For the best fowling piece, two barrels	Silver medal.
For the best fowling piece, one barrel	Silver medal.
For the best and most valuable new invention, which is an improvement on any of the firearms now in use	Gold metal.
For the best solid shot for rifled cannon in use	Silver medal.
For the best shells for rifled cannon use	Silver medal.
For the best powder for cannon use	Silver medal.
For the best powder for rifle or musket use	Silver medal.
For the best gun carriage	Silver medal.
For the best ambulance for hospital use, with the necessary appliances	Silver medal.

Competition for the foregoing will be limited to American manufacturers.

For the following, competition is open to the world:—

For the best and greatest display of firearms, of all descriptions, and all varieties of weapons, with the trappings and accouterments for serving them	Grand gold medal.
For the best and greatest display of military goods, including uniforms, banners, &c.	Grand gold medal.

No premiums will be awarded to any firearm except upon thorough trial before, and under the direction of a competent committee, and the society will spare no pains nor expense to render these trials fair, impartial and decisive.

Accuracy, range and ease and rapidity of loading and firing will be especially considered.

Every piece upon trial will be served by the manufacturer, his agents or employés, and the fullest opportunity will be allowed to complete each test. Each competitor will select and furnish his own ammunition.

The trials will be conducted under the superintendence of Colonel Samuel A. Buckmaster, of Alton, Ill., who will station guards along the line of firing, abundantly numerous to keep it free from transient objects, and insure safety.

JOHN P. REYNOLDS,
Corresponding Secretary of the Illinois State Agricultural Society.

Prices of Cotton and Hemp.

Considerable attention is at present directed to improvements in treating various plants in order to obtain a cheap substitute for cotton and other fibrous substances now used. In order to assist those who are engaged in experiments and investigations in this direction, we publish the following present market prices of hemp and cotton.

COTTON.

	Upland.	*Florida.*	*Mobile.*	*N.-Orleans & Texas.*
Ordinary, per lb	11¼	11¼	11¼	11¼
Good Ordinary	12½	12⅝	12⅝	12⅝
Middling	14	14⅛	14⅛	14⅛
Good Middling	14⅝	14¾	15⅛	15¼
Middling Fair	15	15	15⅛	15½

HEMP.

American, Undressed, per tun	120	—	a130	—
American, Dressed	170	—	a190	—
Russia, Clean	—	—	a	—
Russia, Outshot	—	—	a	—
Jute	82	50	a 87	50
Italian	—	—	a250	—
Manilla, per lb	—	5	a —	5¼
Sisal	—	4½	a —	4⅝

The duty on Russian and Italian hemp is $35 per tun; on Manilla, $15; on Sisal and Jute $10.

Jute is not quite 4 cents per lb., and it can be obtained in any quantity. It is now manufactured into various fabrics, and is frequently mixed with cotton in certain classes of goods manufactured in Scotland. It requires special machinery for spinning, and although it is very low in price, the expense of working it is so great that it cannot compete with coarse cotton in producing cheap cloth.

Six hundred thousand men are deemed necessary by the French government for the defence of that empire.

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INVENTORS THE PROSPEROUS CLASS.

There is no class of persons in these war times who seem to be more prosperous than the inventors and patentees.

We have heard of a number of sales of patents latterly at remunerative prices, and a few that are doing extraordinarily well in manufacturing articles protected by their patents, even in these dull times. The patentees of articles used in camps and by the army, are reaping a rich harvest. There is an enormous demand for improved firearms, cannon, shells, projectiles, explosive grenades, and military accouterments of all kinds. More than half our entire patent department force is kept constantly employed on this class of inventions, and a great proportion of the applications for patents which have passed through this office within the last two months are on the following inventions, which, in the aggregate, pertaining directly and indirectly to the war, amounts to more than one hundred :—Improved breech and muzzle-loading cannon ; mode of mounting and operating heavy ordnance ; improvement in guns, pistols and locks ; improvement in projectiles and shot, the number of the two latter being very large ; improvement in bits for cavalry horses ; improvement in stirrups ; improvement in drinking cups and drinking tubes for soldiers ; tents, camp beds and tables combined ; epaulets and mode of fastening ; modern portable huts for soldiers ; military caps, combining lightness and peculiar shapes for protecting the wearer from the sun, &c. Some of these inventions have been already adopted, and the manufacturers are making money out of their contracts, while others are patiently waiting the action of the officials before whom their inventions have been submitted for examination.

We recognize in some of the inventions in this line, which have passed before us, much novelty and apparent utility, but a large proportion of the plans submitted to us are wanting in both novelty and utility, and on not more than one-fourth of the plans submitted to us can we advise parties to be at the expense of applying for Letters Patent.

We are happy to examine models, or drawings, and descriptions of inventions in this line, and will cheerfully advise parties as to their patentability without charge. Communications should be addressed to Munn & Co., New York, as indicated in our advertising columns.

California Wool Lambs.

American woolen manufactures have increased rapidly during the past ten years, and the native supply of wool seems to be keeping pace with the demand for it. California has now become a great sheep-raising State, and the wool is of an excellent quality. The stock of sheep, as stated in the *California Farmer*, was doubled last year, and at the Mission San José, a merry sheep-shearing festival was held on the 10th of May last, on which occasion a flock of 700 full-blooded merinos, belonging to Mr. A. E. Field, were shorn of their fleeces, which averaged six lbs. each. Sheep are exceedingly prolific in the Golden State, and they early come to maturity. As the supply of cotton may be much diminished this year, there will be a greater demand for woolen fabrics in the form of flannels, next year ; hence it will be the policy and duty of farmers and all who are engaged in sheep raising, to preserve their lambs this season for the sake of their fleeces.

Bridge-burning.—This seems to have become as much a part of the war as the sword and the musket. The Baltimore and Ohio Railroad has suffered terribly at the hands of the secessionists, by the destruction of its bridges, tracks, locomotives, cars, &c. The following bridges along the line of the road have been destroyed:—Opeguon creek, 147 feet span ; Sleepy creek, 219 ; Paterson creek, 145 ; North Branch river, 131 ; Buffalo creek, No. 2, 108 ; Buffalo creek, No. 3, 156 ; Martinsburg, 200 ; and Harper's Ferry, 1,050 feet span. Total, 2,156 feet. It is said that some of the chief officers of the road have been favoring the rebellion as much as they dared. Of this, however, we have nothing but rumor.

In a recent engagement at the Cape of Good Hope, between the English troops and some of the native insurgents, 80,000 shots were expended in killing twenty-five men.

French Arms for the United States.

Major-General Fremont, who, at last accounts, was in Paris, expects to bring home with him arms and accouterments for 10,000 men. His contract reaches $250,000. The first purchase he made reached $75,000 ; and, what is curious, they were rifles (Enfield), bombs, percussion caps, and other articles belonging to the Pope. They had been prepared on contract for the Papal army, but on account of the defeat of Lamoriciere, had, it is said, never been delivered nor paid for. It is said that if the American government will make a direct demand on the French government, through the American Minister, for arms from the French manufactories, it will be granted. The greatest arm of modern warfare is the small rifled piece (6 and 12-pounders), of the French army, mounted in a large proportion as flying artillery. It was this that did most in deciding the battles in the late Italian campaign in favor of the French, and they must decide every field battle in favor of the side that has most of them.

Hints to Volunteers---Keep Your Shoes Easy.

We take the following good advice to volunteers from the June number of the *Atlantic Monthly* :—

A soldier' needs, beside his soldierly drill—first, good feet ; second, a good stomach ; third, and after these come a good head and a good heart. But good feet are distinctly the first thing. Without them, you cannot do your duty. If a comrade, or a horse, or a locomotive, takes you on its back to the field, you are useless there. And when the field is lost you cannot retire, run away and save your bacon. Good shoes and plenty of walking make good feet. A man who pretends to belong to an infantry company ought always to keep himself in training, so that any moment he can march twenty or thirty miles without feeling a pang or raising a blister. Was this the case with even a decimation of the army who rushed to defend Washington? Were you so trained, my comrades of the Seventh?

A captain of a company who will let his men march with such shoes as I have seen on the feet of some poor fellows in this war, ought to be garroted with shoe strings, or, at least, compelled to play Pope, and wash the feet of the whole army of the Apostles of Liberty.

If you find a foot soldier lying beat out by the roadside, desperate as a seasick man, five to one his heels are too high, or his sides too narrow or too thin, or his shoe is not made straight on the inside, so that the great toe can spread into its place as he treads.

I am an old walker over Alps, across the water, and over Cordilleras, Sierras, deserts and prairies at home ; I have done my near sixty miles a day without discomfort—and, speaking from large experience, and with painful recollections of the suffering and death I have known for want of good feet on the march, I say to every volunteer : Trust in God, *but keep your shoes easy !*

Making Statues by Photography.

We take the following from the Paris correspondent of the London *Photographic News* :—

For some time past rumors have circulated of a marvellous application of photography to sculpture, made by a young Belgian artist, François Willême by name, which, in the absence of full particulars, was looked upon with doubt and suspicion as a seeming impossibility was involved in it. Nothing more nor less than the actual production of statues, &c., by the agency of photography, without the aid of the sculptor's hand, was claimed for this new discovery or invention. At first sight this proposal would really seem to involve a contradiction, as two arts, based on entirely different principles and methods, were ostensibly combined in one. For how could it be supposed that by any graphic process whatever, a plastic work could be obtained, seeing that one produces its results on a plane surface by means of light and shade, and the other by relief? However Mr. Willême appears to have solved this singular problem, and the results pronounced by competent authority to be unexceptionable, are now before the public ; and as you have now the details of the process at hand, you can readily judge for yourself whether the applications of photography are not surprisingly and ingeniously enlarged by the genius of Mr. Willême. He claims to have demonstrated that, by the aid of photography, he can produce sculptures from nature, from the living model, from the inert model, from microscopic objects enlarged, sculptures of the same size as the model, or enlarged or diminished, grotesque sculptures, bas or alto-relievos.

Damages Caused by the War.—General McDowell, of the United States Army, commanding in Virginia, contrary to the insinuations of General Beauregard, has issued an order requiring commanders of regiments, so far as possible, to ascertain the value of property taken or damage sustained by the owners thereof. Citizens who have sustained any damage or loss are called upon to present their claims to the commanding officer, that justice may be done alike to the citizen and the government.

More Rifled Cannon.—The War Department, we see it stated, has made a contract with the Phœnix Iron Foundry of Pennsylvania for the construction of 600 rifled cannon.

The duty on foreign salt has been abolished in France, in order to aid the fisheries.

The Best Variety of Strawberry.

At a meeting of the Fruit-Grower's Association of Eastern Pennsylvania, a vote was taken on the best varieties for general (market) culture and for amateur culture, with the following results :—

GENERAL CULTURE.

	Votes		Votes
Albany	25	Vicomptesse Hericart	5
Hovey	8	Longworth's Prolific	5
Triomphe de Gand	7	Large Early Scarlet	4
Iowa	6	Globose Scarlet	4
McAvoy's Superior	7	Trollope's Victoria	3
Cushing	6	Walker, Willey and McAvoy's Extra Red (each)	1
Boyden's Mammoth	6		
Boston Pine	5		

AMATEUR CULTURE.

	Votes.		Votes.
Triomphe de Gand	11	Peabody	5
Vicomptesse Hericart	10	Walker	4
McAvoy's Superior	7	Trollope's Victoria	4
Hovey	7	Boston Pine	4
Hooker	6	Burr's New Pine	4
Jenny Lind	6	Iowa	1

The strawberry can be transplanted at any season of the year when the ground is not frozen. It is the most easily raised of any fruit, and comes most quickly into bearing. If any one of our readers who has a square rod of arable land has not some of this delicious fruit growing, we have no doubt he will find the cultivation satisfactory. For field culture, plant in rows five feet apart, and let the vines cover half the ground. For garden culture in small beds, plant in single hills 2½ feet apart. Have the ground rich, and keep it clear of weeds.

Fusion of Phosphorus.—The Abbé Laborde has observed a new and important property of phosphorus, the knowledge of which may prevent many serious accidents in the manipulation of this combustible.

Take a stick of phosphorus, quite dry, and scrape it with the blade of a knife, so as to detach some fragments, and collect them on a sheet of paper. So long as they remain detached from each other they do not alter their appearance, but the instant they are brought into contact they suddenly melt, and undergo a semi-fusion ; the temperature rises, and sometimes inflames spontaneously.

If instead of detaching the light fragments of phosphorus a thin slice is cut off, in a few moments the edges melt, and if the fusion is rapid, spontaneous inflammation becomes imminent.

Percussion Caps.—A Southern journal states that a gentleman of Fredericksburg, Va., has succeeded in making a very excellent article of caps out of leather and paper. He was in Richmond, examining the machinery for making copper caps, so as to model his after the same pattern. The scrap leather pieces are pressed into shape while wet, are then allowed to dry, and filled as copper caps are with the detonating substance. Both the leather and paper caps are said to be as effective as the regular copper caps. The discovery of this singular war material he thinks has found a way to make both the leather and paper impervious to water.

Another Secession Hitch.—A dispatch from Washington says :—

" Governor Pickens has issued a proclamation forbidding any more South Carolina troops from leaving Palmettodom. He expresses the belief that the Northern hordes contemplate an invasion of the sacred soil of South Carolina, *via* Charleston, and says that the first duty of South Carolinians is to the State."

On the Confederate theory South Carolina has an unquestionable right to withdraw her troops from Virginia. The State is sovereign ; her first duty is to herself ; and whenever her Governor sees fit he can recall his forces. This movement of Governor Pickens is an admirable commentary upon the confederate system. Jeff. Davis is a mere tenant at will.

The " Soldiers' Friend, or Hints for the Physical and Moral Welfare of the Soldiers of the United States," by Dr. Zeigler, of Philadelphia, has recently been issued by Lippincott & Co., of that city. It contains much good counsel in the compass of seven 18mo. pages. Mr. S. S. White, a public spirited gentleman of the Quaker City, has caused to be printed 20,000 copies for gratuitous distribution among the Pennsylvania volunteers. Parties wishing to follow the example of Mr. White will be furnished by the publishers at the rate of $5.50 per 1,000 copies.

In the Russian navy there are two hundred and forty-three steamers and seventy-one sailing vessels, carrying 3,851 guns.

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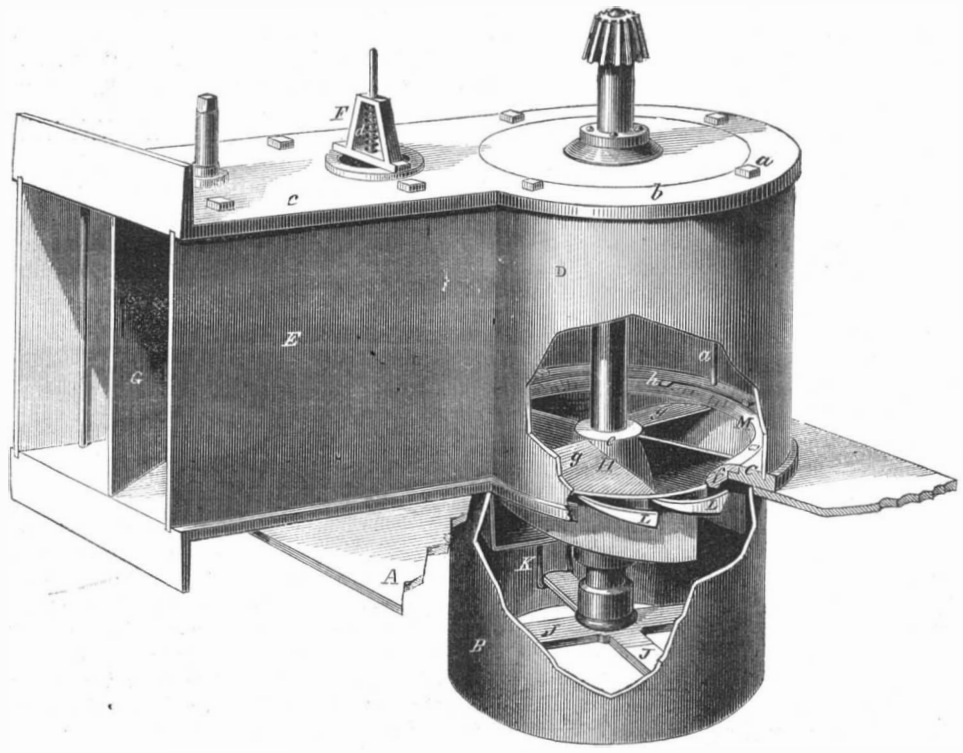
Improved Water Wheel.

Morin, who gave the name of "turbine" to a certain class of water wheels, defines the term as meaning wheels upon a vertical shaft. On that unquestionable authority we designate the wheel here illustrated a turbine. There seems to be no more prospect of inventions ceasing in this class of wheels than in the steam engine; the endless variety of ideas which may be originated in connection with it being strikingly manifested by the improvements and modifications which the inventor of this wheel illustrates in the annexed engraving. Its purpose is to economize in the use of water by appropriating the leakage water so as to utilize its force in driving the wheel, to obviate the friction hitherto produced by water-tight joints, and to discharge the water from the wheel after the closing of the gate, so that the wheel and penstock will be free from water when not in operation. The modification also renders the parts very accessible for the purpose of repairs.

The construction of this wheel is plainly shown in the engraving, which is a perspective view, with a portion broken away to display the interior. A represents a horizontal foundation or bed-piece, in which a draught tube, B, is fitted; this tube being of cylindrical form and of a size properly proportioned to the size of the wheel. C is an annular flanch or plate which is placed on the top of the draught tube, and D is a penstock which is placed on the flanch or plate, C, to which it is secured by screw bolts, *a*. The lower end of the penstock is "let in" the flanch, C, to insure a firm and water-tight connection. E is a water induction passage which communicates with the penstock, D; it is closed at the top by a cover, *c*, which is provided with a valve, F, and has a gate, G, at its outer end. The gate, G, may be an ordinary swinging or sliding vertical gate, and the valve, F, may be an ordinary puppet valve, having a spring, *d*, on its stem to keep it closed when not otherwise acted upon, the valve opening downwards. H represents the wheel, the shaft, J, of which has its upper bearing at the center of the cover, *c*, the lower end of the shaft being stepped at the junction of the bars, J J, which cross each other at right angles, and are suspended by stirrups, K, from the flanch, C. The wheel, H, is composed of a hub, *e*, which is connected with a rim, *f*, by buckets, *g*, the buckets being of spiral form as usual. The upper edge of the rim, *f*, is inclined at an angle of about 45°, and to its lower edge are attached auxiliary buckets, L. These buckets are simply plates or projections of suitable length, inclined longitudinally, and projecting at right angles to the rim, *f*. —On the annular plate or flanch, C, there is secured by bolts, *h*, a conical rim, M; this rim is bolted water-tight to the plate or flanch, C, and it extends to the rim, *f*, of the wheel, H, nearly touching the wheel. The lower edge or face of the rim, M, is parallel with the face of the rim, *f*, and the space between the two is directly over the buckets, L. When the wheel is in operation, the water that leaks through between the rims, M *f*, acts upon the buckets, L, and thus aids in driving the wheel. By this arrangement much friction is obviated, as the rims, M *f*, do not require to be brought in close contact in order to form a water-tight joint as hitherto.

By the employment of the valve, F, the water in the penstock, D, is made to leave the penstock entirely when the gate is closed, the vacuum which would otherwise be produced in the penstock on the water leaving it being prevented by the opening of the valve by the external pressure of the atmosphere. By removing the nuts of the screw bolts, *a*, the wheel may be readily withdrawn from the penstock and all of the parts rendered accessible for repairs.

The patent for this invention was granted through the Scientific American Patent Agency, July 24, 1860, and further information in relation to it may be obtained by addressing the inventor, Jacob W. Truax, at West Concord, Vt.



TRUAX'S IMPROVED WATER WHEEL.

Improved Breech-Loading Rifle.

Though we have little faith in breech-loading cannon, we have the highest opinion of breech-loading small arms. The great and apparently fatal objections to the former do not apply to the latter; while the advantages of breech-loading rifles, especially for soldiers, are very important. The principle of these is the great rapidity with which the arm can be loaded and discharged; and there are others, which, though of a secondary nature, are still worthy of consideration. Among these are the perfect protection of the muzzle from wear and facility for cleaning.

The breech-loading rifle here illustrated is one of the best and most simple, if not the simplest, that has yet been devised, the lock consisting of only three pieces. *a*, and the spring, *b*, throws up the breech, when the latter is released from the catch, *c*, which holds it in in its place. This catch is drawn forward by the spiral spring, *d*, when the breech is down, entering the recess. The breech is raised to receive the cartridge by drawing back the catch, *c*, by means of the forward trigger, *f*, which is attached to the catch. The cock and tumbler are all formed in one piece, *g*, and *h* is the main spring with a short vertical elbow upon its end pressing against the tumbler, as shown; a slot is made in the metal, *i*, behind the breech of the barrel to admit the projection on the end of the cock to strike the rear of the cartridge and explode the fulminating powder which it contains. The copper cartridge case is withdrawn after each discharge, thus removing a considerable portion of the dirt. This case also serves to make a more perfect closing of the breech.

This rifle was invented and patented Oct. 25, 1859, by F. Wesson, of Worcester, Mass. A company under the title of the Smith & Wesson Fire Arm Co. have been formed, who manufacture the arm in the most beautiful style, at Worcester, Mass. J. W. Storrs, No. 12 Chambers street, New York, is agent for the company, of whom further information may be obtained. Army and sporting rifles and pistols, constructed on the same plan, are furnished to order at wholesale or retail at the manufactory, or by Mr. Storrs in this city.

Fig. 1

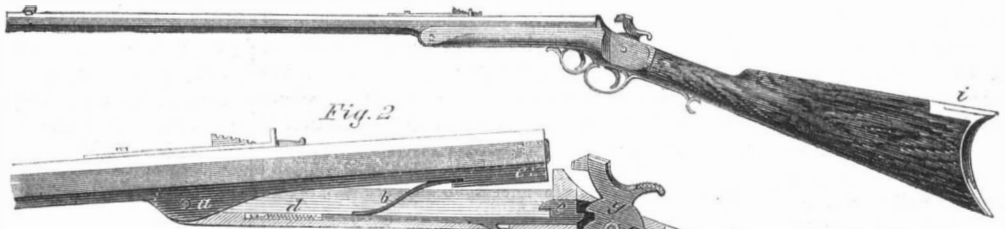


Fig. 2

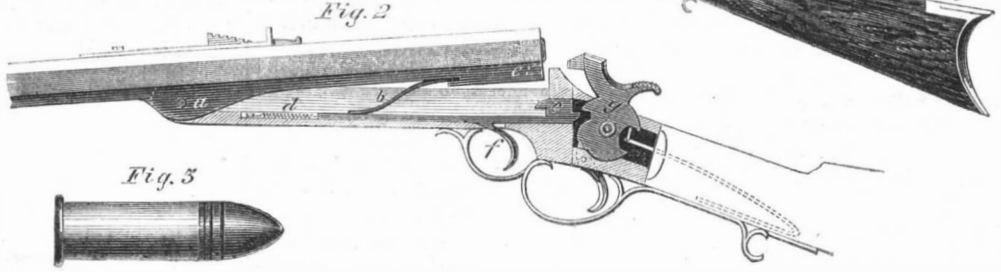


Fig. 3

WESSON'S BREECH-LOADING RIFLE.

In the engravings, fig. 1 represents the arm in position to be discharged, and fig. 2 shows it with the breech open, and the cartridge inserted, which is represented of full size in fig. 3. The bore is open clear through the gun, so that the cartridge may be slipped into the breech, as shown. The cartridge case is made of thin copper in the present approved form, with an acorn-shaped shot attached; a little percussion powder being placed in the bottom of the cartridge. The barrel is secured to the stock by a pivot,

Sawyer's Projectile.

The papers are saying a good deal about the wonderful success of Sawyer's projectile in some recent practice at the Rip Raps, at the mouth of Chesapeake Bay. The result are no greater than should be produced by any projectile adapted to rifled cannon. Experiments in our army, as well as in all others, are rapidly convincing military men that the day for smooth-bored cannon has gone by, and that all artillery must henceforth be rifled. It is only by careful and repeated experiments that the comparative merits of the numerous projectiles which have been devised for rifled cannon can be ascertained. A very elaborate series of experiments for this purpose was being conducted under the direction of competent officers of the ordnance department of the army, when they were interrupted by the inauguration of war. Among the projectiles which had been tried was Sawyer's. This is a single mass of cast-iron with numerous wings upon it, planed to fit the rifle grooves in the gun with a corresponding spiral. It is essentially the same as Sigourney's, illustrated on another page, except that the latter has but two wings in place of some 12 or 14 in Sawyer's. The objection made to these shot with cast-iron flanges is that they wear off the lands, or projections between the grooves of the rifled cannon. Sigourney clams that he has overcome this objection, but how thoruoghly we are unable to say. Practical experiments only can determine the utility of any of these new projectiles which are being invented and brought in such quick succession before the public.

A Liberal Present.—Elias Howe, Jr., the sewing machine inventor, has presented each of the field officers of the Massachusetts Fifth Regiment with a fine horse.

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VOL. V. NO 1.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, JULY 6, 1861.

THE BEGINNING.

During the seventeen years we have been publishing the SCIENTIFIC AMERICAN, we have presented no volume to our readers with more satisfaction than the one which closed with the last number. The variety and richness of its contents are greater than those of any of its predecessors. Among the more prominent of these are :—A complete course of Faraday's lectures, profusely illustrated ; an illustrated history of the steam engine from the earliest times, with biographical sketches of the inventors who have made the principal improvements in its various parts ; a series of original articles on the nature of wealth, and the process of its production ; and a current history of the war, carefully prepared each week from the latest and most authentic accounts, together with illustrations of the latest improvements in war implements.

These are in addition to our usual record of discoveries in science, and our illustrations of new inventions in the mechanic arts in Europe, as well as in this country. The unusually valuable character of the latter were especially noticed in our last issue. Among the illustrations of inventions transferred to our columns from foreign journals will be found an engraving of the first practical air engine, invented by Robert Stirling, of Scotland, and a cut of Lenoir's gas engine, which is attracting so much attention in France. This volume also contains an engraving of the apparatus employed in the important experiments on turbine water wheels at Philadelphia, and an illustration of the experiments which demonstrated the frailness of the Armstrong gun.

It would be useless to specify in detail all the prominent features in the history of the past year, as it stands related to the progress of the arts and sciences.

These wonders teach, in a very impressive manner, the uncertainty of the future. What new devices of inventive genius, or what new marvels of scientific discovery the next six months may bring forth, it is impossible for the boldest intellect to imagine.

It shall be our constant and unceasing aim to keep our readers fully advised of all that shall occur during the ensuing year. The mind is almost bewildered in view of the stupendous scenes that are before us. The nation is rocking upon its very foundation, and the ingenuity and wisdom of our people will be taxed to the utmost to devise means to carry the country over the breakers. Mechanical ingenuity will play a conspicuous part in all these grand movements, and in these columns only can the public curiosity be gratified with a full view of all that takes place in this department.

To enable us to meet the reasonable expectations of our readers, we must be supported by their generous subscriptions, and we promise them, in return, a compensation ten-fold in value. The SCIENTIFIC AMERICAN is, beyond doubt, the cheapest paper of the kind ever published, and we wish to say to our readers distinctly, that but for the professional business of this office we could not afford to give them an illustrated journal of this character, in these times, for two dollars a year. We urge our friends to remember this fact, and to use their exertions in extending its circulation.

An Enfield rifle ball makes two hundred revolutions per second, after leaving the barrel.

EXPERIMENTS WITH McCARTY'S CENTRIFUGAL GUN.

An *intense* crowd of persons assembled at the foot of Thirty-second street, North River, this city, on the afternoon of the 19th inst., to witness experiments with Mr. R. McCarty's centrifugal gun. A few persons were permitted to examine it in the building before it was taken out for operation, but the interior was not exposed. Its external appearance is almost like that of a narrow fan-blower mounted upon a long low carriage. The bullet case is placed in front, and consists of a vertical circular box secured on a shaft. In size it is three feet in diameter and about three inches broad. A tube or bullet barrel 24 inches long is placed tangentially at the top of the case and serves as a guide for the discharge of the bullets. At the center, on one side, is placed a small copper hopper into which the bullets are fed from the tubes, containing twelve iron balls, each 1¼ inches in diameter, and weighing four ounces. On the other side of the axle of the case is a small pulley over which a belt passes from a fly-wheel pulley near the back end of the carriage. The belt pulley receives a very high velocity from the driver shaft, the speed being communicated through cog gearing. The driver shaft is operated by a large crank lever at each side, and two reciprocating brakes capable of permitting ten men to work the machine. The power is accumulated by rotating the centrifugal bullet case for some moments before the balls are discharged.

A large target of common inch plank was placed in front of the gun at a distance of about 130 paces, and after getting up a high velocity on the machine, by the men working at the brakes, a stream of about sixty bullets was discharged in a few seconds. A number of the bullets struck the ground ricochetting in front of the target ; several passed over the target, and a number smashed through it and went about 40 or 60 yards beyond. This was done three times in succession. The tube of the centrifugal case was elevated to about 40°, and several bullets were discharged more slowly and with greater range than before, but as they went into the river, we were unable to judge of the distance.

A number of army and navy officers were present, and the experiments were conducted with more promptness and dispatch than is usual in such cases, Inventors and owners of new inventions, who make public exhibitions, very frequently do injury to themselves, and impose upon those whom they invite as witnesses, by not having all things arranged to commence operations at the hour appointed. A few weeks since we went to see a series of experiments in gunnery, and were kept waiting three full hours after the time appointed before the trial commenced.

Mr. McCarty was the first inventor who patented a centrifugal gun in America (and in Europe also, we believe). This was in 1838. There can be no question about its ability to discharge a stream of bullets without powder, by manual labor alone. Placed in a situation to defend a narrow pass, or a breech in a fort, against a storming party, it could throw a steady stream of bullets against the foe. It is capable of being operated by steam as well as manual power. A very large gun, upon this principle, is now in the course of construction by the inventor, which we examined in the workshop ; it is intended to be driven by a steam engine.

JAMES' RIFLED CANNON.---IN WHAT IT CONSISTS.

We are frequently asked in what consists the peculiarity of James' rifled cannon, and we publish this reply to the question for the benefit of all who are interested in the subject. There is no such ordnance as James' rifled cannon, and it is a misnomer to so call it. James' invention consists in the projectile only, which, like all those of its class—projectiles with expanding rings of soft metal—is adapted to any rifled cannon, but especially to those with numerous shallow grooves. The six-pounder used by Gen. James in his recent exhibition, was rifled with 14 grooves, about a sixteenth of an inch in depth, the lands being of the same width as the grooves. They commence at the breech, parallel with the axis of the gun, and deviate to a constantly increasing spiral, which terminates at the muzzle in a twist of one turn in nine feet. This makes an excellent rifled cannon, though it is the opinion of some artillerists that in guns of this size the twist may be increased with advantage to one turn in five feet at the muzzle. This gives the shot some 16,000 to 20,000 rotations per minute. The Whitworth gun recently on exhibition in this city had a twist of one turn in three feet, which would give the shot some 30,000 rotations on its axis per minute, allowing the initial velocity to be 1500 feet per second.

STEEL CLAD STEAM CHARIOTS OF WAR.

In ancient times, armies went forth to battle clad in steel. The horses of cavalry, as well as the men, were covered with coats of mail, and the infantry had steel caps and coats, and even their limbs were encased in metal. The Assyrians and Gauls had also chariots of war, beside horsemen and footmen, in their armies. Each chariot was generally drawn by four fleet horses covered with mail, and harnessed abreast. Huge scythes, projected horizontally from each chariot, which, beside a driver, contained several warriors who were expert at throwing the javelin and drawing the bow. It is rather remarkable that, with improvements in destructive agents of warfare, such as gunpowder, artillery and muskets, steel armor gradually went out of use. The supposition is quite natural that, instead of abandoning mail armor with the general introduction of firearms, it would be the very thing to modify, in a great measure, the advantages of firearms, still leaving the victory to the strong man, instead of the skilled, but perhaps light, marksman.

Of course, coats of mail are not proof against artillery, but they are against lead bullets ; and perhaps they may yet be reinstated in their former position. Modern military tactics are mostly based upon rapid movements, which most persons believe cannot be effected with heavy armor-clad soldiers. But it is a fact that the tactics of the great Cæsar, as they relate to rapidity of movement, have never been surpassed ; indeed, they were the model of Napoleon, who, in exhorting his army upon one occasion, told them they had not yet rivaled the legions of the great Roman. Cæsar's soldiers were clad in cuirasses ; they also carried heavy iron shields.

The navies of Europe are now being remodeled upon the old principle of clothing soldiers in mail, and for similar reasons we would not be surprised if steel coats would again come into use in armies.

An entirely new feature may also be yet introduced into warfare in the character of steel clad steam chariots. Each should consist of a light but strong road locomotive, covered with steel plates, and mounting a pivot rifled cannon on a shielded platform. The locomotive which was fired upon by the masked battery at Vienna, Va., last week, would have been able to dislodge the enemy had it carried an 18-pounder, and been protected with a steel shield an inch thick. Steam locomotive batteries require special adaptations to secure new results, but there are inventors who can supply all the details.

Mail clad towers may also be drawn or pushed up by steam engines close to batteries and forts. From these, soldiers may be able to send down showers of iron hail upon an enemy. The Power which has the most money to pay for such destructive agents, and which, at the same time, commands the best mechanical genius to invent and construct the mechanism, will be irresistible.

OWNERS WANTED FOR MODELS.—The following models have been recently received at this office, without the names of the inventors or owners being attached, and without any letters accompanying them to indicate who they are from, or for what purpose they have been sent:

One tin model of a plow.
One coil of pipe, from Boston.
One full-sized cooking stove.

The owners of the above articles will please to forward us their names, and state what they desire done with them.

TO OUR EXCHANGES.—To the press generally we owe our warmest thanks for friendly notices. We have not sent them, as usual, our annual prospectus ; we trust, however, that they will extend to the SCIENTIFIC AMERICAN their usual salutations. The paper will be continued to all such journals as thus indicate a desire to receive it *without an exchange.*

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ELECTRICAL SPIRIT RAPPERS---INTERESTING DEVELOPMENT.

We have seen a spirit, "and such a spirit." It was none of your airy imponderable spirits, but a substantial spirit, seen with the eyes and handled with the hands. It consisted of a thin wooden box about six inches square, containing an armature and magnet which had been connected with wires to a galvanic battery. When the electric circuit was broken and closed by a button-key the magnet produced a rap in the box, and, according to the formula of those who are skilled in the interpretation of spirit language, these raps were read off as a message from the spirit world. A distinguished professor in New York was once a frequent visitor to the establishment where such spiritual manifestations occurred, and the box which we examined had been called the "professor's mother," as he communicated through it so frequently with his beloved and departed parent.

Not very long ago, a certain house, in one of the fashionable streets of our city, became distinguished for spiritual visitations. Great numbers of the curious were nightly attracted to its parlor (the fee was one dollar for each visitor), for the purpose of receiving messages from that unseen bourne from whence, it is said, "no traveler has returned." Many visitors went away quite satisfied, while others were not quite so delighted at having paid their dollars for the ambiguous answers that were given by the spirits. But among all the visitors none was so frequent and satisfied as the professor alluded to. He always paid his dollar with a cheerful spirit, and felt comforted with the entertainment. But the delusion came to an end at last. The managers of the establishment had contrived to get into debt, and after due process of law, the sheriff came one day and exorcised the spirits in a most effectual manner, for, upon the carpets being taken up, about forty spirits were dislodged in the form of little boxes such as we have described. These were placed at certain distances apart under the boards of the flooring, and some were concealed in the partition walls. The wires of the boxes formed an electric circuit, communicating with a galvanic battery in an upper room. Small buttons formed keys to open and close the circuit; these keys were placed under the carpet in situations well known to the managers. By pressing upon one of these buttons with the foot the electric circuit was closed in the same manner that a telegraph is operated, and the magnet then made a rap, generally right under the feet of the inquirer, who was always attended by an operator, who generally succeeded in learning something of the previous history of the individual. A clever French electrical mechanician in Broadway furnished these spirits to order. Those who "pulled the wires" in the spirit-rapping establishment, however, not only pulled the wool over the professor's eyes, but over the French mechanician's also. He jocularly relates that, although he furnished the spirits, he has never been able to rap his dimes for them out of the crafty fellows who managed to rap so many dollars out of their deluded dupes. We have heard of other modes whereby such rappings have been produced, but none so scientific as this.

NEW ODORLESS BURNING FLUID.

A peculiar burning fluid, for which a patent was issued to Benj. F. Hebard, of Neponset, Mass., on the 19th of February last (1861), has been the occasion of considerable inquiry as to its nature, and wherein it differs from the old burning or explosive fluids, and common coal and purified earth oils. We therefore give the following description of this new burning fluid as derived from the specification of the patent. Its composition consists of

25 gallons of fusel oil.
15 " " camphene (rectified spirits of turpentine)
5 " " kerosene—either obtained from coal or shales, or oil wells, and refined.
1 pound of the essential oil of lemons or other fragrant oil.

To prepare the composition, the fusil oil and the turpentine are poured together into a glass or stoneware vessel furnished with a discharging valve tube at the bottom. Three gallons of water are also added and the whole stirred together for a few minutes, then allowed to settle. Several impurities with the water sink to the bottom. These are run off by the bottom valve-tube until the mixed fusil oil and turpentine only remain.

The kerosene and the fragrant oil are now added, with one gallon of water, and again stirred, and then allowed to rest. The water and some more impurities now settle to the bottom, when they are to be run off as before described. The composition which remains is the patented burning fluid.

It is stated in the patent that this oil emits no fetid odor, is inexplosive, it burns in coal oil lamps, and will not grease fabrics upon which it may be spilt. It is also said to be more durable in burning than the highly refined kerosene and earth oils, and that it gives a very soft flame. The wick of the lamp is encrusted but very little in burning, and it may be raised quite high without smoking.

The main composition upon which this invention is based, is the fusil oil and the camphene. The essential fragrant oil disguises any offensive odor belonging to the fusil and kerosene oil. This is certainly a useful improvement, as it converts the hitherto fetid and useless fusil oil to a good purpose, It turns over a new leaf in the book of applied industry.

RECENT AMERICAN INVENTIONS.

Cooler and Evaporator.—This invention relates to certain improvements in that class of evaporators or coolers which are constructed of a series of pipes, laid one above the other or side by side, and having their ends connected by elbows or crosspipes, and it consists in placing the pipes so close together that each of them is supported from end to end by the next succeeding pipe, whereby the pipes are prevented from sagging down in the middle, and an unbroken corrugated evaporating or cooling surface is presented. It also consists in the arrangement of projecting angles on one or more sides of each pipe, extending within a short distance in such a manner that sufficient room is obtained for the elbows or connecting pipes, and at the same time an unbroken corrugated surface is preserved. The credit of this invention is due to John Trageser, of New York city.

Case Hardening.—This invention consists in the employment or use of fused lead, or other suitable material, in combination with cyanide of potassium, or any other suitable cyanogen compound, such as cyanide of ammonia and with carbon, in such a manner that the iron articles to be case hardened are exposed to an atmosphere of condensed cyanogen gas, and that the influence of said gas on the iron is facilitated to such an extent that it can be made to penetrate to any desired depth. The patentee of this invention is E. P. Weston, of East Corinth, Maine.

Car Coupling.—This invention relates to that class of car couplings which are termed self-coupling, and consists in attaching to the bolt a sustaining rod or bar so arranged in relation with the draw head that it may be acted upon by the shackle or link of an adjoining car as it enters the draw-head, and made to release the bolt so that the latter may drop into the link and couple the cars. The invention also relates to a novel and improved means for sustaining the shackle or link in the drawhead, so that the former may be retained in a horizontal position and in line with the draw-head of an adjoining car, that it may enter the same as the two cars approach each other, and insure the connecting together of the same. This invention is patented by A. H. Trego, of Lambertville, N. J.

Pressure Gage.—This invention relates to that class of pressure gages in which the pressure of the steam or other fluid is received on a flexible plate. It consists in the combination for the purpose of transmitting the movements of the plate to the index, of a lever and a screwed or spirally grooved spindle. It also consists in a certain mode of providing for the movement of the lever to adjust or correct the gage. This is the invention of R. Finnegan and A. F. W. Schulte, of New York city.

Tanning.—This invention consists in the employment or use of the root and other parts of the plant known by the name of red root (*Ceanothus Americanus*) as a substitute for tanning bark for the purpose of tanning skins and hides. The patentee of this invention is Henry McKenzie, of Talladega, Ala.

Bell-ringing Device.—The object of this invention is to obtain a device by which a large or turret bell may be rung and struck at a different point at each blow, the hammer or hammers traversing around or having a rotary movement. By this means the bell will not be liable to crack, as all parts of its lower end are subjected to equal concussions; and the invention admits of any one ringing the bell, as the turning of a crank wheel is all that is required to effect the result, and a very moderate application of power is required for the purpose. The credit of this invention is due to Rhodolphus Kinsley, of Springfield, Mass.

Traction Engine.—The object of this invention is to overcome the difficulty attending the necessary slow movement of traction engines while at work, to wit, the difficulty of throwing the crank past its centers. The invention, although applicable to any traction engine which may be required to move slowly at certain times, is more especially designed for steam cotton picking devices, formerly patented by this inventor. The invention consists in the employment or use of springs constructed of india-rubber, or other suitable elastic substance, applied to the crank to effect the desired end. This is the invention of John Griffin, of Louisville, Ky.

Machine-made Unfermented Bread.

Raised bread, resembling common loaves made from fermented and baked flour, is manufactured at present upon a somewhat extensive scale on the corner of Fourteenth-street and Third avenue, in this city. The flour and water for making a batch of bread, are run into a large globular cast-iron vessel, and thoroughly mixed by a stirrer revolving inside, and driven by a steam engine. The lid of the iron vessel is then rendered perfectly air tight, and all the air is extracted by an air-pump when the flour is thoroughly wet.

The mixed flour is thus expanded and rendered porous. Carbonic acid gas, under a considerable pressure, is now admitted among the dough, which is still continually stirred, until the whole mixture is charged with the gas. When this is effected, the operator takes his seat at the table under the vessel, and piles of tin pans are laid at his side. A tube projects down at the bottom of the iron vessel containing the dough. The operator now shoves a pan under this tube, opens the cock, when the pressure of the gas inside forces out the mixed dough in a stream, and the pan is filled in half a second. The pans are handed to the baker, who instantly places them in the oven. From the time the flour is placed in the iron vessel to be mixed, until it comes from the oven in the form of bread, the time occupied is only one hour. This is a rapid method of making bread, and as the labor is mostly performed by machinery, the cost of its manufacture is less than for making fermented bread. We have seen raised bread made by charging the water with carbonic acid gas, instead of charging the dough, but the bread by the latter method we consider much the better. We understand that there is now a very large demand for this bread, and that the machinery is kept running day and night to supply it. The taste is slightly different from bread made by fermentation. There are no fears of the dough becoming sour during warm weather by the carbonic acid gas process.

The inventor (Mr. E. Fitzgerald) of this system of bread making, has also devised an apparatus which will soon be applied, by which the loaves will be weighed by self-acting mechanism, and the pans filled with the dough, at one continuous operation.

Suspension Grenades for Forts and Houses.

Wherever there is original genius there will not be wanting occasions for its display. This was the case at the siege of Fort Sumter. There were no elevating screws for the guns, but Major (now General) Anderson found a substitute in wedges made out of common plank. And when expecting a night attack by a storming party, he found a most destructive means of defence and offense in grenades made of the shells which the old conspiracy War Department had furnished in abundance, but without fuses to use them in cannon.

Numbers of these shells intended for cannon firing were packed with powder, and common fuses containing percussion powder were placed in the holes. The wire of each fuse was then attached to a strong cord, and the shells were suspended carefully over the walls where they hung perfectly safe for action. By drawing the cord quickly—giving it a snap—the percussion powder of the friction fuse became ignited, and the shell exploded. Had a storming party attacked the fort at night, these shells would have scattered death and destruction among their ranks.

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Business in Chicago.

A late issue of the Chicago *Times* refers to a croaking article in the New York *Herald*, in regard to the future commercial prospects of the country. The *Times* speaks more especially with reference to the business of the West, and says :—

The *Herald* thinks that the falling off in the traffic of our roads for the third week in May is an indication of the general paralysis which is rapidly fastening itself on the commerce of the country, and seems to think that the business of the West is rapidly approaching a state of stagnation. We are happy to inform the *Herald* that it was never wider off the mark. The falling off in the business of the lines centering in Chicago during the third week in May, is solely to be attributed to the fact that the National Republican Convention held in Chicago last season, swelled the passenger business of the lines far above what they would otherwise have been. The fears of our Eastern friends in regard to our losses on the currency, are altogether without cause. It is true that the wiping out of over $6,000,000 of currency in a single week, caused a momentary stagnation of the general business of our city and State, but so vast are our resources, and so wonderful our recuperating powers, that it takes but a few days for us to recover from a financial shock which would prostrate the business of any other city for months. Last week, in the general anxiety as to the future, upon which nearly all classes of the community were agitated, it was seriously believed that the traffic upon the canal and railroads would be almost entirely cut off for a couple of months at least. The singular elasticity of the Northwest has never been so strikingly illustrated. In the last two days we have received here in Chicago over 200,000 bushels of corn, 97,000 bushels of wheat, 8,774 barrels of flour, besides other produce. We have inquired at the offices of the leading railroads, and they are generally hopeful for a large business in June. The Illinois Central will not vary $5,000 in traffic from that of May last year ; and in the Land Office the sales this dull month are nearly $150,000, and the collections $254,000.

Rifled Muskets in Ohio.

The Cincinnati *Commercial* has the following account of a trial of rifled muskets near that city:—

The trial was for the purpose of testing the powers of resistance to the best small arms now in use, of various thicknesses of iron and steel, and was held in the presence of Captain Rogers, U. S. N., and numerous other gentlemen, iron manufacturers and others, Captain Rogers having been appointed by government to superintend the arming and fitting up of the steamers lately purchased here for the gunboat service.

The arms tried on this occasion were the Enfield, Colt's, and other celebrated rifles, Minié or United States rifled muskets; and, lastly, our Ohio arms—the last named being the old United States regulation musket, rifled, sighted, and otherwise improved, at Miles Greenwood's Eagle Iron-works, in this city.

A sheet of the best quality charcoal boiler iron was put up at 90 feet distance, and all of the arms on the ground fired at it in turn. The Minié and others of the rifles named made quite deep impressions in it, but none succeeded in putting their balls through the metal excepting the altered musket. The balls of this gun penetrated it in every instance, and, in fact, seemed to meet with little resistance in passing through it. With three-eighth inch steel plates, the result was about the same. Against all the other arms it was proof, but every shot from the altered musket passed through it with ease. The last test was with the toughest and best quality of three-eighth inch wrought boiler plates. None of the balls fully passed through this, but while it was but slightly marked by all the others, the balls from our Ohio muskets penetrated the iron to their depth, and remained sticking in it, causing it to project five-eighths of an inch on the reverse side. Next to our muskets in strength of shooting appeared to be the United States rifle or Minié musket, the Enfield proving decidedly inferior to these.

We have heard that, at a private trial had since the above, balls from the altered muskets succeeded in penetrating good three-eighth inch boiler iron ; and that some satisfactory shots were made at a distance of over 2,400 yards, or nearly a mile and a half.

The Voice of Henry Clay.

During the debate in the Senate, in 1850, on the "Compromise Measures" of that year, Mr. Dawson, of Georgia, declared that the contingency had arrived which compelled the calling of a convention in his State to provide for the extreme remedy of disunion. Henry Clay followed him, and, in the course of his remarks, threw out the following patriotic sentiments, which every man at this time ought to read :—

"Now, Mr. President, I stand here in my place, meaning to be unawed by any threats, whether they come from individuals or from States. I should deplore, as much as any man living or dead, that arms should be raised against the authority of the Union, either by individuals or by States. But after all that has occurred, if any one State, or a portion of a people of any State, choose to place themselves in military array against the government of the Union, I am for trying the strength of the government. I am for ascertaining whether we have a government or not —practical, efficient, capable of maintaining its authority, and of upholding the powers and interests which belong to a government. Nor, sir, am I to be alarmed or dissuaded from any such course by intimations of the spilling of blood. If blood is to be spilt, by whose fault is it? Upon the supposition, I maintain it will be the fault of those who choose to raise the standard of disunion, and endeavor to prostrate the government; and, sir, when that is done, so long as pleases God to give me a voice to express my sentiments, or an arm, weak and enfeebled as it may be by age, that voice and that arm will be on the side of my country, for the support of the general authority, and for the maintenance of the powers of this Union."

Exhibition of James' Projectile.

On Saturday, the 22d ult., General James chartered the steamboat *Key Port*, and invited some 200 gentlemen and a few ladies to accompany him to the lower bay to witness a practice with his patent projectile for rifled cannon. The boat left the dock a little after 12 oclock and proceeded to the Narrows, taking a lighter in tow, on which was a brass 6-pound field piece and an iron 42-pounder, both rifled. Passing through the Narrows, the expedition continued on a safe distance from land and stopped in the middle of the Lower Bay, when General James and a party of his friends put off in a boat to the lighter, the principal portion of the guests remaining on board the steamboat. The sky was clear, the air calm, the water smooth, and in all respects the day was as perfect for the purpose as could have been selected in the whole year. Two large steamers were going out to sea, the bay was dotted with white sails in every direction, and one beautiful yacht passed the *Key Port*, firing a salute as she came alongside ; all showing that the commerce of the country is moving right on, in spite of the great war that is raging in the land.

The first shot was fired from the 6-pounder, with the gun in a horizontal position, or "point blank," as artillerists say. The report was followed by the sound of the air rushing through the openings at the base of the shot—a rough, loud WHI–SH–SH—and as the shot struck the water it made a spot of white foam, and then, skipping off in ricochet, struck again perhaps half a mile beyond. After a few discharges of solid shot, a shell was fired, and as it struck the water, it exploded with a loud report, sending up a shower of spray.

After several shots with the field piece, the 42-pounder was fired with an elongated shot, weighing 87 pounds. At point blank, the spot of white foam where the shot struck was visible from the steamboat, but when the gun was elevated some 10 degrees, the shot was sent so far, and entered the water at so high an angle, that the place where it struck could not be seen from the boat. The steamboat containing the guests was accordingly sent off from the lighter from which the projectiles were fired about three miles, nearly in the direction of the range, in order that the spectators might observe the effects of the shot striking the water. The lighter from this distance looked like a low black log on the water. After the puff of smoke, it was 15 seconds before the report was heard, showing the distance to be just three miles. Four seconds after the report, the loud whi-sh-sh of the shot through the air was heard, and it struck about a third of a mile short of the boat ; the range consequently being about $2\frac{2}{3}$ miles.

Our readers are aware that James' invention is one of several that have been made for adapting acorn-shaped shot to rifled cannon. The problem is to fit a portion of the surface of the shot into the spiral grooves of the cannon, so as to give the shot a rotary motion on its axis during its flight through the air ; this motion tending, by a well known law in mechanics, to preserve the axis parallel to itself, as is illustrated in the spinning of a top, and thus to keep the point of the shot directly forward.

To fill the rifle grooves many plans have been tried. General James surrounds the cylindrical portion of his shot with a band of soft metal—either lead or an alloy of lead and tin—and then makes a number of openings leading from the base of the projectile forward under the leaden band, so that the latter may be pressed outward into the grooves by the force of the gases generated by the combustion of the powder. The objection which has been urged against this shot is that the bands are thrown off and the fragments scattered in a way to be dangerous to the army in field service using the projectile. In the experiments above described there was a good opportunity to observe the striking of these fragments in the smooth water. After each discharge they were observed to throw up the spray over a considerable area, extending from a point perhaps 200 yards from the cannon, as far as they could be seen among the small ripples on the water. General James' reply to this objection is that soldiers are never placed so near the line of fire that they would be hit by these flying fragments. To our minds the reply is not satisfactory. But if the objection is fatal to the use of this projectile in field fighting, it manifestly does not apply to the use of the shot in naval warfare and the defense of fortifications. And if the projectile is cheaper, or in other respects better than all others, it may be adopted for these departments of the service.

It is well understood by the military authorities of our Federal government, and we respectfully remind those of the several States who are purchasing arms and projectiles that there are a variety of projectiles for rifled cannon in market, and that the prices of these with their qualities are worthy of examination before large contracts are made for any one kind.

How Bomb Shells are Made.

The manufacture of bomb shells is very interesting. The shell is first filled with old fashioned round leaden bullets ; melted sulphur is then poured in to fill up the interstices and bind the bullets in one solid mass ; the shell is then put into a kind of lathe, and a cylindrical hole, of the exact size of the orifice of the shell, is bored through the bullets and sulphur. This cavity is filled with powder even with the interior edge of the orifice, a 6-inch shell of the kind here described holding about half a pound. The fuse fitted into the orifice is a recent Belgian invention, made of pewter, and resembles the screw-cap used for the patent fruit-cans. An examination of this pewter cap shows, however, that it is made of two hollow discs of metal screwed together and filled with meal powder. A number of fine holes are drilled in the lower disc, while the outer disc is entire, and marked with figures in a circle, 1, 2, 3, 4. In this state the shell is water-proof. When taken for use, the gunner, by means of a small steel instrument, scoops out a portion of the outer soft metal surface, and lays bare the charge of composition powder below it. If the shell is desired to explode in one second after leaving the gun, the scooping is made on the figure 1 ; if in two seconds, on the figure 2, and so on—the idea being that the shells of this description shall first strike the object aimed at and do execution as a ball, and then explode, sending the bullets forward as if from another cannon, located at the point where the flight of the shell is arrested. Large shells of eight or ten inches are filled with powder only, and bursting, do execution by means of their fragments. These large shells are generally fired by means of a fuse of meal powder, extending through a brass plug screwed into the mouth of the shell. In both cases the fuse is fired by the ignition of the charge in the gun.

Mosquitoes Aiding Secessionists.—We extract the following from Mr. Russell's letter to the London *Times* describing his visit to Mobile :—

"Are there many mosquitoes here?" inquired I of the waiter on the day of my arrival. "Well, there's a few, I guess ; but I wish there were twice as many." "In the name of goodness why do you say so?" asked I with some surprise and indignation. "Because we'd get rid of the —— Black Republicans out of Fort Pickens all the sooner," replied he. There is a strange unilateral tendency in the minds of men in judging of the operation of causes and results in such a contest as that which now prevails between the North and the South. The waiter reasoned and spoke like many of his betters. The mosquitoes, for whose aid he was so anxious, were regarded by him as true southerners, who would only torture his enemies. The idea of these persecuting little fiends being so unpatriotic as to vex the Confederates in their sandy camp never entered into his mind for a moment. In the same way a gentleman of intelligence, who was speaking to me of the terrible sufferings which would be inflicted on the troops at Tortugas and at Pickens by fever, dysentery, and summer heats, looked quite surprised when I asked him "Whether these agencies would not prove equally terrible to the troops of the Confederates?"

General Josiah Harlan, who is to command the Kentucky Cavalry regiment, is a native of Pennsylvania. For nearly twenty years he was actively engaged in military operations in India, having assisted in organizing the forces of Runjeet Singh, prince of the Punjaub, and afterward performed the same service for Dost Mahommed, of Cabul. During the successful campaign against the Uzbeck Tarters in 1838–'39, he distinguished himself as commander of a division of the Cabul army. While a resident of India he paid a high tribute to his native land by raising the Stars and Stripes over one of the highest passes of the Indian Caucasus, 12,000 feet above the level of the sea, and at the same time fired a national salute.

The treatment of persons poisoned has hitherto been that of a chemical decomposition of the poisonous substances. It is now proposed to correct their effects by another method, that of administering poisons of a depressing character to counteract those of an exciting one. This is the new Italian practice. Thus laudanum has been neutralized by bella donna.

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UNITED STATES NAVY YARD.

To show the extent and importance of the mechanical operations at the national navy yards, let our readers read this short account concerning the yard at Washington :—

The morning bell rings in over six hundred mechanics, together with a large corps of laborers, swelling the number of employés up to nearly a thousand, independent of those connected with the shipping, and a full regiment of troops, all of whom are actively employed.

SHIP HOUSES AND SHIP BUILDING.

Every branch of naval art, from the building of the hull of a steamship of war of the largest class, to the smaller articles required in her finish, are prepared in the navy yard. Here some of the largest and finest ships in our navy were built. Among the latest is the *Minnesota*, 3,500 tuns, now in the Gulf. In another ship house on the opposite side of the yard, the *Potomac* was constructed. The river is navigable for ships drawing eighteen feet of water up to the navy yard.

MARINE RAILWAY.

In the repair or examination of the bottoms of war ships, the marine railway offers every facility. The steamer *Mount Vernon*, a few days since, was discovered to be in a leaky condition ; she was immediately brought to the marine railway, and by the force of an immense hydraulic engine she was drawn from the water and repaired in short meter, and is again in the fleet.

ENGINE AND BOILER SHOPS.

These important branches are conducted in the large center building, which measures 432 by 265 feet in size, two stories high, and contains six large steam engines, required in vitalizing the operations in this great naval workshop. Engines and boilers, of any capacity required in the navy, are constructed. Those for the large war sloop *Pensacola*, together with all of her machinery, have just been completed here, and put up in that vessel, now nearly ready for service.

THE ANCHOR SHOP.

Here a forcible illustration is presented of the power of mind over matter. The building is 265 feet long, with forges requiring two tuns of coal to a single fire, and trip hammers weighing five tuns, every impact of which produces a concussion felt over a large portion of the yard. Here the waste or scrap iron from the United States navy yards is brought together and converted into blooms, and these into navy anchors, varying in size from the convenient kedge to the best bower of the largest ships afloat.

CHAIN SHOP.

In this department there are seventy-eight fires and one hundred and twenty men. Cables, embracing the entire range in size, are here manufactured, and their strength thoroughly tested, before they leave the shop. These, with the usual ship work, give employment to a large corps of workmen.

ROLLING MILL.

Large quantities of copper, brass and composition metals are employed in the construction of war ships. The heavy rolling mills are propelled by a double engine of 150-horse power, with a 19-tun balance wheel making 60 revolutions per minute. Copper from the Cliff Mines of Lake Superior is used, after passing through the refining process is formed into round or square bars, or rolled out into sheets for ships' bottoms, or for cutting into nails, or forming into percussion caps, and is reduced, when required, to the thinness of the sheet of paper in the reader's hands. Lead from Western mines is also rolled into sheets for all the purposes required in the navy.

NAIL WORKS.

Copper and iron cut nails of every size, from the small tack to the largest nail required, are manufactured in the yard. The machinery is of the most approved kind, and very efficient.

BLOCK MAKING.

Blocks for new ships and for supplying the wear and tear of those already in the service, are manufactured. The machinery is propelled by steam power.

STEAM SAW MILL.

There is a very efficient saw mill with upright saws in the yard, for cutting heavy timber. For lighter work, circular saws are employed.

PLUMBERS' DEPARTMENT.

A large amount of plumbing is required in the navy yard, and the works in this department are in active operation. A steam engine is employed to drive the various machinery.

CABOOSE AND WATER TANK MANUFACTORY.

Quite an interesting department, and presenting scenes of busy activity. Ships' galleys, with apartments for soup, meats, baking, &c., for a ship's roll of one to five hundred men, are being manufactured, together with all the articles required in the culinary department.

BRASS FOUNDRY AND FINISHING ROOMS.

The brass foundry, brass finishing rooms, and copper refinery are contiguous to each other. Here brass and composition castings are made, finished and prepared for use. In the refinery, copper is subjected to intense heat in ovens, purified and cast into cakes about 12 by 14 inches square and 1½ inch thick, in which condition they are removed to the rolling mills, and there reduced to sheets.

RIGGING AND SAIL LOFTS.

These are large, light and airy. At present they are partially used as quarters for the regiment assigned for the navy yard.

THE ORDNANCE DEPARTMENT.

The machinery in this department is pressed to its utmost capacity. In a building over 200 feet long, every available foot of space is occupied with machinery, and every piece of machinery is in motion. In the ordnance foundry (which is entirely distinct from the brass foundry, in another part of the yard), brass cannon and howitzers of all the various sizes are cast in large numbers. These are then passed into the main ordnance building, when they are turned, bored, finished, and mounted on carriages. The Dahlgren improvement, in the composition and mechanical construction, has been adopted in all the guns used in the navy, and experience accords to the Dahlgren guns greater endurance, range, and accuracy than any other artillery of equal weight now constructed, either here or in Europe.

MINIE AND MUSKET BALLS.

The Minié ball is made with great rapidity, on an ingenious machine invented by a lieutenant in the army. The lead is supplied to the machine in round bars, and the balls are turned out at the rate of 16,000 in ten hours, or 266 per minute. Musket balls (used also for canister shot for cannon) are manufactured even with greater rapidity. The machinery is kept in constant operation.

SHOT, SHELL, AND CANISTER.

Shot of all sizes, and shell from four up to eleven inches, are rolled out hot from the molds in rapid succession. They are cast with great precision, and afterward put through a process which gives them a perfect spherical form. Canister shot are made from both cast-iron and lead. They are packed in canisters, made to fit the bore of the cannon, and each canister, when filled, is soldered up. The weight of the canister thus filled, is made to correspond with that of the ball prepared for the same size of cannon.

SHELL AND AMMUNITION BOX FACTORY.

In this, as in all other departments, the works are driven by a steam engine, and great activity prevails. Every shell, when completed and charged, is inclosed in a box for protection, from which it is not removed until required for use. These cases and ammunition boxes of the various sizes required, are now being manufactured in large quantities. In this department all kinds of cabinet and joiner's work for the navy are prepared ; offices, bureaus, desks, &c., are manufactured. A large number of hands are employed.

OUTSIDE MOVEMENTS.

The wharves are covered with shot, cannon, little mountains of coal, naval stores, &c., while war and transport steamers lie closely together in the docks.

OBEY THE LAWS.—Motley, in his recent able argument in behalf of the Constitution and the Union, states that the Supreme Court of the United States, after the government had been established, held this language in an important case—"Gibbons against Ogden" :—

"It has been said that the States were sovereign, were completely independent, and were connected with each other by league. This is true. But when these allied sovereignties converted their league into a government, when they converted their Congress of ambassadors into a legislature, empowered to enact laws, the whole character in which the States appear underwent a change."

There was never a disposition in any quarter in the early days of our constitutional history to deny this great fundamental principle of the Republic.

An Immense Fortification in Progress on Sandy Hook.

Some two years since, it will be remembered that a great topic of discussion in military and civil circles was the defences of New York harbor. There was a prevalent opinion among the most distinguished engineers that, in order to complete the protection of the bay and city, and prevent a descent of hostile forces on the shores of New Jersey, it was absolutely necessary to guard the outer key of the Atlantic, by erecting a huge fort on the most favorable portion of Sandy Hook. Defences thus located, it was believed, would command the ocean access to the empire city, and strengthen the upper forts for a renewed attack in case an enemy should pass beyond reach of their batteries.

Acting on this suggestion, the Federal government ordered the building of an immense fort on the western portion of the beach, which, from its extent and solidity, will no doubt be considered one of the most formidable harbor defences of the United States. The corner stone of the fort was laid on the 26th of March, 1859. The walls will cover an oblong area of about one mile in length. It will have five bastions, the length of each of which will be in accordance with the extent of its particular command of some point of the Atlantic. At present the northeastern bastion is nearly ready for mounting guns, and the eastern and northern curtains which protect it are sufficiently elevated to lay the embrasure stones. Two are nearly ready for the guns. The stones in front of the fort are from six to eight tuns weight, and were brought from quarries in Quincy, Mass., and Maine. The tiers of guns will have strong and spacious casemates. The foundation, which is laid in concrete, was made seven feet from the surface, and the breadth of the walls at the base is 14 feet, and on the top 10 feet. The casemates are indented about 36 feet from the outer walls, commanding all points of the surrounding ocean. The fort will be protected by deep trenches at its outer points.

Steamboat for African Travel.

Messrs. Todd & McGregor, of Glasgow, have lately launched a screw steam yacht of 110 tuns burthen, built for Dr. Livingstone, the African traveler, intended for the navigation of the river Shire and the great Lake Nyassa, above the Falls. She is called the *Lady Nyassa* ; is to have a pair of direct-acting high pressure engines ; and when ready for sea will only draw 3½ feet of water. This steamboat is to be taken to the river Zambesi in pieces ; therefore she has been built to be put together with screw bolts instead of rivets. She will be first tried on the river Clyde before being taken to pieces for shipment. It is only a few years since this great lake in Africa was discovered by white men ; now it is about to become a scene for mercantile operations and steamboat enterprise. Such are some of the rapid changes which modern science and art effect.

American River Steamboats in Ireland.

We take the following extract from the *Dublin News* :—

The introduction of American-modelled steamers of great speed and light draft of water in our rivers and bays is a great improvement on the old dark and ill-ventilated boats, that from the very smell caused sea sickness. We would hope to see the American system on and over deck fully carried out. That we are gradually losing our prejudices and adopting useful innovations can be seen from the Citizens' Company of Cork, whose boat ran from Glasgow to Queenstown, with 30 tuns of coals on deck, drawing 3⅛ feet of water, in 27 hours, or at the average rate of 16 miles an hour. Since her arrival in the Lee, she has made the trip from Cork to Queenstown and back, with several calls and 600 passengers, in 1 hour and 47 minutes; a local paper adding:—"The stiffness of the *Citizen* was tested during the day in a remarkable manner, her top-load was something enormous, but the immense weight did not affect her in the least, she preserved a perfect level without the slightest leaning to one side or other." So much for flat floors and fine wooden ends, instead of the sharp bottoms, with a great rise, of our builders, thinking that sails, not steam, were the power. In Newcastle-on-Tyne several are plying as well as on the Southampton and Isle of Wight station. These boats have their decks extended to the width of the paddle-boxes, on beams supported by sponsons. Thus, a steamer of 16 feet width will have the main deck from 25 to 30 feet, giving from 50 to 80 per cent more room, and if she would have a hurricane deck, from 200 to 300 per cent without extra fuel or labor. Their draft of water is but 2½ feet, with a speed of 16 miles.

GUN COTTON FOR SHELLS.—Gun cotton burns so suddenly that it is apt to burst cannon, if used in them in place of gunpowder. But it has been suggested to us that this same property peculiarly fits this substance for the charging of bomb shells. We do not see why the idea is not a good one.

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Patent Claims

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 11, 1861.

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*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

1,498.—Hiram Aldridge, of Michigan City, Ind., for an Improvement in Machines for Thrashing and Separating Grain:

I claim, first, The arrangement on the front of the concave, A, of a thrashing machine of two slotted and perforated ears, a a, said ears serving as guideways for pins, b b, and as bearings for the upper ends of the adjusting hand screws, D, which are located in front of the concave and within the frame of the thrashing machine, all in the manner and for the purpose described.

Second, The arched or raised cover, H, made in two parts, which are hinged and dowelled together, and form, when on the machine, a continuation of its side boarding, all in the manner and for the purpose described.

Third, The arrangement of a beater, G, which has a space existing between its blades and its axis, and operates, in the manner described, between the ends of the canvas belt, F, and open straw carrier belt, E, for the purpose set forth.

Fourth, The adjustable open extension straw carrier belt, N, and extension guideway, O, in combination with the canvas belt, E, and first straw carrier belt, F, substantially in the manner and for the purpose described.

Fifth, The arrangement and combination of the extra closed beater, P, with the first and second open straw carrier belts, F N, substantially in the manner and for the purpose described.

Sixth, The combination of the extension tailboard, Q, with the inclined bottom of a straw carrier guideway, d d or O, substantially as and for the purpose described.

Seventh, The combination of a chaff carrier, T, which is adjustable on a fixed axis, U, in the path of a vertical circle, separator shoe, K, inclined transverse return spout, Y, and elevator, Z, substantially in the manner and for the purpose described.

Eighth, The arrangement of the lower end of the adjustable inclined sieve or deflecting board, S, on a permanently located shaft, U, so that it may be adjusted from its upper end in the path of a vertical circle, substantially as and for the purpose set forth.

Ninth, The arrangement of the outside hangers, S′, of the adjusting frames which carries the sieve and chaff carrier, in combination with the shafts, U W, curved slots, n n, and screw-threaded bearings, m m, with clamp nuts, substantially in the manner and for the purpose described.

Tenth, The extension tailboard, Y′, in combination with an inclined sieve, which is adjustable on a fixed axis, U, in the path of a vertical circle, inclined bottom of the separator shoe, K, incline transverse spout, Y, and elevator, Z, substantially as and for the purpose described.

1,499.—John Andrews, of Brunswick, Maine, for an Improved Mode of Securing Circular Saws to Arbors.

I claim the combination, in the manner substantially as shown and described, of the hollow, adjustable collar, E, conical bush, D, and fixed recess collar, B, with each other and with the saw, C, and arbor, A, all as set forth for the purpose specified.

[In adjusting circular saws on their shafts or arbors, great difficulty is generally experienced in consequence of the variation in the diameter of the eyes of the saws. When too large, the eyes require to be bushed in order that they may fit their arbors, and when too small they require to be filed out. The object of this invention is to obviate this difficulty, and to this end a sliding or adjustable bush is employed, in connection with a fixed and an adjustable collar and nut, to effect the desired end.]

1,500.—C. L. W. Baker (assignor to himself and J. W. Bliss), of Hartford, Conn., for an Improved Corn Broom:

I claim an improved article of manufacture, consisting of a broom, being composed of the fiber of broom corn set in tufts in a block of wood, substantially in the manner as and for the purpose described.

1,501.—H. L. Baldwin, of Branford, Conn., for an Improvement in Curry Combs:

I claim the described curry comb as a new article of manufacture, having its back plate, A, and teeth, a, cast in one piece, the teeth being of cylindrical or an approximate form, and about of an equal thickness throughout their length, as and for the purpose specified.

[This invention consists in casting the plate or back of the curry comb and the teeth in one piece, whereby an implement is obtained which possesses many advantages over those manufactured in the ordinary way.]

1,502.—Sarah A. Baldwin, of Waterbury, Conn., for an Improvement in Skirt Supporters:

I claim the combination of the several strips, A B, arranged and secured together and furnished with shoulder straps, D D, lacing hooks, i i i, and spring pins for attaching the skirt to the supporter, all as described and represented.

[The nature of this invention consists in forming the supporter of strips of covered steel, whalebone or reed, put together with clasps so as to form a waistband which will encompass the body, and in combining with their band shoulder straps and backstays, and a means for lacing the band around the body, and also spring pins for attaching the skirts to the band.]

1,503.—L. D. Barrand, of New York City, for an Improved Scroll Sawing Machines:

I claim, first, The two inclined planes, F F′, on which the rollers, d d d d, work, arranged as set forth, in combination with springs, E E′, connected to the guide bars, C C′, between which the saw is hung, substantially as described

Second, The slotted lever, G, connected to the lower carriage on the inclined plane, F′, operating as and for the purpose described.

Third, The guide flanges, f f, on the inclined planes, F F′, for guiding the rollers, d d, of the saw carriages, as set forth.

[This invention relates to certain improvements in that class of sawing machines in which a saw frame or sash is not employed, and which are generally known as "mulley" saws.]

1,504.—H. H. Beach, of Philadelphia, Pa., for an Improvement in Grain Winnowers:

I claim the two series of chutes represented by the letters, e and d, when combined and arranged substantially as and for the purposes set forth.

1,505.—S. W. Bidwell, of Hartford, Conn., for an Improved Machine for Boring and Mortising:

I claim the arrangement of the pulleys, i, belt, d, friction rollers, e, with the sliding heads, B, and pulleys, c, substantially as and for the purpose described.

1,506.—C. H. Burd, of Roxbury, Mass., for an Improved Telegraphic Apparatus:

I claim the combination of the permanent magnet, A, the two helices, B B, and the non-magnetic movable U-piece, C, the whole arranged substantially as explained, and so as to operate together under circumstances and in manner as specified.

I also claim the key as constructed and made to operate with a battery the two helices, the permanent magnet and the non-magnetic U-piece, substantially as described.

1,507.—Amos Chase, of North Weare, N. H., for an Improved Adjustable Chair:

I claim the rod, C, secured to the under side of the seat, D, and fitted in the socket, B, when used in combination with the bar or brace rod, G, connected with the back, F, and secured at its lower end to an arm, H, which is attached to rod, C, and is fitted in a slot, c, in the socket, B, the whole being arranged as shown to form an improved sliding or adjustable chain or seat.

[An engraving of this invention will appear soon.]

1,508.—Darwin DeForest Douglass, of Springfield, Mass., for an Improvement in Window Blinds:

I claim, first, The flat metallic guide bars, A and C, made substantially in the manner described and for the purpose specified.

Second, The rack and pinion, G and I, or its equivalent, in combination with the guide bars, A and C, and blinds, for the purpose specified, and operating substantially in the manner described.

1,509.—W. C. and J. Dunn, of New York City, for an Improvement in Carriage Bodies:

We claim, first, The combination of the open body, A, with the standing top, formed of the end pieces, E E, top, F, panels, G, and doors, H, secured together as and for the purpose set forth.

Second, The combination of the permanent open body and calash top with a standing top, constructed as explained, the whole being adapted and arranged to form a new and improved convertible body for vehicles, as set forth.

[The object of this invention is to combine an open body, brett or barouche body and close or standing top coach body all in one vehicle, so that either form of vehicle, by a simple manipulation, may be had as desired, and the whole device rendered capable of being manufactured nearly as cheap as the ordinary coach,]

1,510.—R. Finnegan and A. F. W. Schulte, of New York City, for an Improved Pressure Gage:

I claim, first, The employment for transmitting the movements of the flexible plate, B, to the index, g, of a lever, F, and spirally grooved spindle, H, combined and applied substantially as specified.

Second, The movable block, E, carrying the fulcrum of the lever, F, and the screw, I, applied in combination with the slotted bar, D, or its equivalent, and operating substantially as specified, for the adjustment or correction of the gage.

1,511.—John Griffin, of Louisville, Ky., for an Improvement in Engines, &c., for Overcoming Dead Point in Cranks:

I claim the combination with the crank, B, of a suspended ring, D, suspended between springs, E E, so as to act upon the crank when passing its centers, in the manner shown and described.

1,512.—David Haines, of Union Bridge, Md., for an Improvement in Hominy Machines:

I claim the hopper, D, arranged as set forth, the vibrating stirrer, E, connecting rods, i j, arm, k, and crank shaft, G, all arranged and operating as and for the purposes described.

[This invention relates to certain novel improvements in machines for making hominy, and clearing the same of its bran and other impurities. The nature of this invention consists in arranging within a perforated cylinder a series of toothed beaters of a peculiar character, and in giving opposite rotary motions to said cylinder and beaters, for the more perfect and rapid reduction of grains of corn to hominy. It also consists in the arrangement of a vibrating stirrer within the hopper for keeping up a regular feed, said stirrer being combined with and operated by the crank shaft, which gives the shaking motion to the riddle.]

1,513.—Edward Howell, of Ashtabula, Ohio, for an Improvement in Sewing Machines:

I claim the operating of the wheel, E, when constructed and arranged as described, by means of the elastic pad, K, substantially as and for the purpose specified.

1,514.—E. F. Hyde, of Brooklyn, N. Y., for an Improvement in City Railroads:

I claim the arrangement of the sliding adjustable wheel, D, with the axle, C′, and lever, E, as and for the purpose shown and described.

[The object of this invention is to supersede the use of the ordinary switches and switchmen which are necessarily employed to adjust or operate them, so as to not only economize in labor but also to economize in the expense of the construction of the ward at the turn-outs as well as in keeping the same in proper repair.)

1,515.—G. L. Jencks, of Providence, R. I., for an Improvement in Hemming Guides:

I claim the peculiar arrangement or method, substantially as described, of uniting the fingers, 1 2 3, upon the stock of a pressure pad, for the purpose specified.

1,516.—Rhodolphus Kinsley, of Springfield, Mass., for an Improved Bell-ringing Apparatus:

I claim, first, The employment or use of one or more hammers, N, secured to a rotating platform, C, and operated simultaneously and automatically with the platform, C, so as to strike the bell, A, and gradually rotate within or beneath it, for the purpose specified.

Second, The placing of the hammers, N, within adjustable tubes or sockets, L, arranged substantially as shown, for the purpose of adjusting the hammer, so that the latter will always strike the bell at right angles.

Third, The arrangement, as shown and described, for the gearing, F F G J and K, with the radial arms, e, on wheels, F F, the pins, c d, on the wheels, K F, the springs, O, on hammer rods, M, and the rotating platform, C, for the purpose set forth.

Fourth, I claim the combination of the hammer springs, O, with the check springs, P, when applied to the hammer rods, M, to operate as and for the purpose specified.

1,517.—W. S. Kirkham, of Branford, Conn., for an Improvement in Locks and Knob Latches:

I claim constructing the hub, F, of two parts, f g, fitted together as shown, and both parts placed on the knob arbor, G, and used in connection with the spring, H, the above parts being arranged with the slide, E, lever, D, and latch, C, to operate as and for the purpose set forth.

[This invention relates to an improvement in locks or knob latches, whereby the latches may be turned so as to suit either right or left hand doors, and properly secured in position so that they cannot be casually turned.]

1,518.—Wm. A. Lighthall, of New York City, for an Improvement in the Construction of Tube Sheets for Coolers and Condensers:

I claim constructing tube sheets for tubular coolers and condensers in the manner set forth.

1,519.—Henry Lowe, of Baltimore, Md., for an Improvement in the Manufacture of Caustic Soda:

I claim the molding and burning of artificial carbonate of lime, substantially in the manner and for the purposes set forth.

1,520.—Richard Mansley, of Philadelphia, Pa., for an Improvement in Machines for Opening Rope:

I claim, first, The combination of the separate upper feed rollers, D D′, &c., their supports, P, and the rods, d, connecting them with the levers, d″, and weights, d‴, the whole arranged substantially as described and for the purpose aforesaid.

Second. The combination of the beaters, b, knife blades, b′, and the adjustable feeding apparatus, the whole constructed and arranged substantially as described.

1,521.—James McCarty, of Reading, Pa., for an Improvement in Annealing Cut Nails:

I claim annealing cut nails by confining them in a suitable vessel, subjecting both vessel and contents to a red heat, and allowing the whole to cool from six to twelve hours, according to the size of the nails and tube, and maintaining the vessel airtight during the heating and cooling process, as set forth.

1,522.—H. McKenzie, of Talladega, Ala., for an Improvement in Tanning Leather:

I claim the employment or use of the root and other parts of the plant known by the name of Ceanothus Americanus, either alone or mixed with oak bark or other tanning materials, as described, for the purpose of tanning hides or skins.

1,523.—W. H. Nichols and F. D. Strong, of East Hampton, Conn., for an Improvement in Nail Heads:

We claim an ornamental nail or screw, made with a head which is first cast upon the shank and then pressed in the manner shown and described.

[This invention is an improvement in forming ornamental metallic heads on the heads of common nails or screws by first casting a circular blank on the head of a nail or screw, suitably adapted to the size thereof, and then producing from said blank a head of the desired shape and ornamentation, by subjecting the blank to swaging dies adapted to the purpose, thereby obtaining a superior article, at less cost and with less imperfect work than can be made in the ordinary methods of forming ornamental heads on nails and screws.]

1,524.—J. S. Parker, of West Willington, Conn., for an Improvement in Machines for Turning Spools:

I claim the combination of the protecting dog, E, or its equivalent, with the cutter head, A, for the purpose described.

[This invention consists in the arrangement of a hinged dog, in combination with an adjustable slide, and in such relation to the longitudinally sliding cutter head that, by the action of said dog, the end of the block is kept clear of the cutter intended to square said end until, by pushing the cutter out, the other end of the block is firmly driven into the spurs of the spur center, and a turning of the block independent of the said spur center.]

1,525.—F. A. Perry, of St. Louis, Mo., for an Improved Ornamental Fabric or Manufacture for Window Shades:

I claim as a new manufacture, a thin fabric prepared in the manner described, and ornamented in imitation of embroidery, either needle or tambour, in colors or white, substantially in the manner set forth.

1,526.—J. H. Phillips, of Waverly, Mo., for an Improvement in Hemp Brakes:

I claim having the edges of the clearers, a a, made in scolloped form, and so operated and geared that the scolloped blades of one wheel shall alternately pass between the blades of the opposite wheel, thus alternately elevating and depressing the hemp between the scolloped edges, all in the manner and for the purpose shown and described.

[The nature of this invention consists in passing the stalks of hemp or flax (the machine being well adapted for either purpose) between two breaking feed rollers which bruise and crack the woody matter, and afterward submitting the bruised stalks to two peculiar rotating cleaners, the slats of the wheels spread the stalks, and break away or knock off the boon from both sides of the stalk, and, at the same time, give the stalks a shaking motion without injuring the long fibers.

1,527.—S. S. Putnam, of Dorchester, Mass., for an Improved Horseshoe Nail Machine:

I claim, first, Connecting each pair of hammers to a single lever or crosshead, through which they are operated, and by means of which they may be made to strike simultaneously and accurately around a line passing through the center of the nail rod.

Second, In combination with the above, I claim the connecting rods, s and v, and eyebolts, r and u, or their equivalents, operating as set forth, for the purpose specified.

Third, I claim interrupting the action of the hammers while open, and holding them open at the will of the operator, for the purpose specified.

Fourth, I claim the rod, J, in combination with the levers, G and H, and with the hand lever, W, and lever, r′, or their equivalents, whereby the hammers may be stopped and started at the will of the operator, as set forth.

Fifth, The gage, d2, which is brought into position to gage the nail rod while the hammers are stationary, and is drawn out of the way before they are again started by devices acting by the power of the machine itself, but brought into action of the operator, as set forth.

Sixth, I claim the rod, F, with its notch, 15, and shoulder, 2, in combination with the shaft, U, and the parts immediately connected therewith, whereby the nail rod is always returned to its position, and the cutter, y′, is raised out of the way of the hammers before they are started, as set forth.

1,528.—G. W. Rains, of Newburgh, N. Y., for an Improved Apparatus for Steam Boilers:

I claim, first, The inverted conical throat, g, arranged relatively to the water pipe or passage, a, and in combination with a piston rod passing through the bottom of the cylinder, substantially as and for the purpose specified.

Second, Furnishing the piston, B, with one or more valves, e, applied to operate substantially as described for the purpose set forth.

Third, The independent weight, J, applied to the piston rod, C, to operate in combination with the dog, I L, substantially as and for the purpose specified.

[This invention consists in certain improvements in the apparatus which constitutes the subject matter of Seller's patent, issued to the same inventor on April 24, 1860, and re-issued July 24, 1860. It could not be well explained without an illustration.]

1,529.—J. R. Robinson, of Boston, Mass., for a Damper for Steam Boilers:

I claim the combination with a sliding damper applied to the rear tube sheet of a horizontal multitubular boiler, of a stationary frame, C, interposed between the said tube sheet and the damper, to form a space between the said damper and the tube sheet, substantially as and for the purpose specified.

And I also claim the construction of the so applied frame, C, with two or more openings, b b1 b2, each or a size to communicate with one or more tiers of tubes, said openings being separated by bar-like partitions, which either fit to the tube sheet or not, as shown at d and e, in Fig. 2, substantially as described.

1,530.—J. R. Robinson, of Boston, Mass., for an Improvement in Valve Gear of Steam Engines:

I claim, first, The employment of two eccentrics connected by a link, for the purpose of closing the ports at various points in the stroke of the piston, in combination with independent means of opening the ports for the induction of steam, substantially as described.

Second, The employment, in combination with the so applied link, and its supporting rocker, N, of a toggle, O P, so arranged and applied that, by a continued movement in one direction, it will carry the link throughout its whole range of motion on the valve wrist, and back again, substantially as and for the purpose specified.

Third, The employment for combining the throttle valve with the toggle, O P, which effects the movement of the cut-off link, of a toothed pin, p, a notched hook, X, or its equivalent, a stationary pin, p′, and a spring, q, the whole combined and operating substantially as specified.

1,531.—J. B. Sawyer, of Templeton, Mass., for an Improved Cane Seat for Chairs:

I claim, as a new article of manufacture, a cane bottom chair made single, but the strands of ratan in which are so interwoven as to form a continuous bearing surface, and are secured to the frame, A, by suitable holes, fi, in the manner substantially as specified.

1,532.—W. B. Strong, of New York City, for an Improved Trunk Convertible into a Bedstead:

I claim a trunk formed of two equal parts, a a′, connected by hinges at one end, and provided with lids, b b′, the latter having a folding frame, c, a framing combined with bars, e d, a cover, C, of waterproof cloth or mosquito netting, and a suitable mattress, B, all arranged to form a combined army trunk and bedstead or couch, as set forth.

[The object of this invention is to combine a trunk and bedstead in such a manner that the trunk may have nearly its usual available capacity for the reception of clothing, and still admit of being readily converted into a bedstead when required. The invention is designed for

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the use of the army. Officers and such members of the army as are allowed to carry trunks with them while occupying the tents of a flying camp, cannot be generally provided with anything in the way of a bedstead to keep them elevated above the surface of the ground.]

1,533.—E. F. Slocum, of Chicago, Ill., for an Improvement in Lamps:

I claim the combination of three or more springs with a lamp top, arranged substantially as described and for the purpose specified.

1,534.—E. W. Smith, of New York City, for an Improvement in Steam Engines:

I claim, first, Heating the cylinder of a marine steam engine by inclosing said cylinder in whole or in part within steam, which is generated separately from and at a higher pressure and temperature than the initial pressure of the steam admitted to the interior of the cylinder, substantially as and for the purpose set forth.

Second, The employment of the donkey boiler, C, connections, D, the steam jacket or connected spaces, B1 B2 B3, and the connection, G, leading from the base of such connected spaces to the main boiler or series of boilers, A, all combined and arranged substantially as and so as to operate together in the manner set forth.

1,535.—George Smith, of New York City, for an Improvement in Combined Burglar Alarm and Animal Trap:

I claim the sere, E, arranged or pivotted as shown, to admit of cords or chains being attached to both ends of it, in combination with the hammer, C, and one or more fire-arm barrels, A, substantially as and for the purposes described.

[The object of this invention is to obtain an implement which may be connected to one or more doors or windows of a building, so as to sound an alarm if any one of them is opened, the implement at the same time being capable of advantageous use as an animal trap.]

1,536.—Abraham Stroh, of Port Jervis, N. Y., for an Improved Car Coupling:

I claim the combination and arrangement of the slotted gravitating drop, H, bolt, G. box, C, springs, c, draw-head pipe, B, bolt, E, and draw-head, A, all in the manner and for the purposes herein shown and described.

[The object of this invention is to obtain a coupling for railroad cars that will admit of cars having platforms of different lengths being connected together, the coupling also admitting of a perfectly free vibration of the cars both laterally and vertically. Another object of the invention is, that it may couple itself and the parts be so arranged that in uncoupling or disconnecting the cars, the piece used need not be withdrawn from the draw-head but merely elevated a certain distance to clear or free the shackle, and be at that point supported by a drop. The invention has further for its object the applying of springs in such a manner as to insure durability and a perfect action thereof.]

1,537.—S. C. Sturtevant, of Cleveland, Ohio, for an Improvement in Tubular Grates for Steam Boilers:

I claim a series of detachable flue grates when used in combination with the pipe, F, as and for the purpose specified.

1,538.—John Trageser, of New York City, for an Improvement in Apparatus for Evaporating Liquids:

I claim the arrangement of one or more angular projections, a, on the sides of the pipes, A, of a cooler or evaporator, substantially as and for the purpose shown and described.

1,539.—A. H. Trego, of Lambertville, N. J., for an Improvement in Car Coupling:

I claim the attaching of rods or bars, C, to the bolts, B, when the said rods or bars are arranged as shown, so that their lower ends may, as the bolts are elevated, drop by their own gravity into the back parts of the draw-heads and sustain the bolts, the rods or bars being at the same time, in such position as to be acted upon or thrown out by the entrance of the shackle or link into the draw-heads, so that the bolt may drop into the link, substantially as described.

1,540.—C. Van Name, of Binghamton, N. Y., for an Improved Stanchion for Canal Boats:

I claim the employment of cast iron stanchions, A, with flanches, a b, and attached to the deck, B, by means of bolts, c d, as and for the purpose described.

[This invention consists in the employment, for the purpose of supporting the rail, of a cast iron stanchion secured by bolts, which pass down through the deck, one of them into one of the beams which support the deck, and another into one of the ribs, in such a manner that by said stanchions the strength of the boat is increased, and that a blow on the rail does not injure the structure of the boat.]

1,541.—James Weathers, of Greensburg, Ind., for an Improvement in Heading Bolts:

I claim the heading tool, A A', B, C, C', c, D, D', constructed and operating substantially as set forth.

1,542.—E. R. Weston, of East Corinth, Me., for an Improvement in the Process of Converting Iron into Steel by Cementation:

I claim the use of the fused or fusible metal upon the clay covering in the crucible, as set forth.

1,543.—S. R. Wilmot, of Brooklyn, N. Y., for an Improvement in Hoop Skirts:

I claim constructing the metallic slides and tips for hoops of skirts, with a lip or stop, c, of a length equal to the thickness of the hoop, substantially as and for the purpose set forth.

[The object of this invention is to provide tips and slides for the hoops of skirts with stops, so arranged as to prevent the hoops from slipping through them and at the same time admit of the tips and slides being swaged or glued directly on the hoops without any previous manipulation of any kind, thereby greatly economizing in time in their manufacture.]

1,544.—S. E. Woodworth, of Murphys, and J. E. Wethered, of San Francisco, California, for an Improved Arastra:

We claim the combination of a cast iron arastra with ball bearings, G E G E, and ball pivot, H, of hollow center shaft, I, constructed in the manner and for the purposes described.

1,545.—G. W. Bridgman (assignor to himself and Osgood Dane,) of Somerville, Mass., for an Improvement in Car Brakes:

I claim the combination and arrangement of the two rack bars, K K, the racks, I I, the gear, H, and the two pinions, G G, and drums, F F, or the mechanical equivalent of such pinions and drums, applied to the carriage body or platform frame, and the draft chains of the brakes of the two truck frames.

I also claim the arrangement and combination of the hand wheel shafts, N N, pinions, M M, and racks, L L, or their mechanical equivalents, with the carriage and the rack bars, K K, the racks, I I, the gear, H, the two pinions, G G, and drums, F F, or the mechanical equivalent of such pinions and drums, the whole being to operate substantially as and for the purpose or purposes, as specified.

1,546.—S. L. Fitts (assignor to C. and G. C. Winchester), of Ashburnham, Mass., for an Improved Boring Machine:

I claim the construction of an automatic machine for boring holes around the edge of an irregular-shaped article, when arranged and operating substantially as set forth.

Second, I claim the ratchet, r, and feed mechanism, O P Q R S, in combination with the revolving boring or drill shaft, D, operating substantially as described.

Third, I claim the sliding carriage, I, and spring, L, for holding the carriage, M, up to the stop, v, or its equivalent, operating substantially in the manner set forth.

1,547.—A. M. Hill (assignor to W. S. Kirkham), of Branford, Conn., for an Improvement in Locks and Knob Latches:

I claim the fitting or placing of the latch, C, of the lock in a collar, which is placed in the face plate, B, and allowed to turn therein, the collar having two parallel plane surfaces, e e, at its inner part, and used in connection with the slide, I, placed at the inner side of the face plate, all being arranged as and for the purpose set forth.

[This invention relates to a simple means for admitting of the latch of the lock being turned to suit either a right or left hand door, and consists in leaving the outer part of the latch fitted in a collar which is placed in the face plate of the lock case and allowed to rotate therein, the collar being retained or prevented from casually turning by means of a catch or fastening.]

RE-ISSUES.

90.—J. A. Vaughn, of Cuyahoga Falls, O., for an Improvement in Grain Separators. Patented April 24, 1860.

I claim the combination of a series of zig-zag riddles and directing boards, having a shake motion imparted to them with a short fan, when arranged to operate therewith substantially as described.

91.—J. A. Vaughn, of Cuyahoga Falls, O., for an Improvement in Grain Separators. Patented April 24, 1861:

I claim in combination with a series of zig-zag screens or riddles, and a series of directing boards having a shake motion, the stationary receiving chambers, for receiving the material from the screens, substantially as herein described.

I also claim the combination of the series of zig-zag screens and directing boards having a shake motion, the stationary receiving chambers, and short fan, when arranged to operate substantially as herein described.

I also claim the combination of the directing board, P, cockle riddle, Q, and cockle board, substantially as and for the purpose herein described.

92.—Ira Perego, Jr., of New York City, for an Improvement in Shirt Bosoms. Patented Sept. 25, 1860:

I claim, first, A shirt bosom made with a stiffening strip or strips of suitable material, applied substantially as and for the purposes herein set forth.

Second, A shirt bosom having the upper portion thicker and stiffer than the lower portion, substantially as herein described.

[The object of this invention and improvement in shirt bosoms, is to prevent the upper part of the bosom, which is in sight, from rumpling or drawing up, and thus presenting a very unsightly appearance after being worn but a short time. The nature of the invention consists in the employment of an extra thickness or thicknesses of cotton, linen, or other suitable material supplied to the bosom of a shirt, that the upper part of the bosom, or that part which is in sight, will be rendered less flexible than the lower part of the bosom, when the bosom is starched and ironed in the usual manner. It will be perceived that the unstiffened part will break first and have the effect of keeping the upper portion stiff and unbroken for a considerable length of time.]

DESIGNS.

67.—Levi L. Tower (assignor to Cutter, Tower & Co.), of Boston, Mass., for a Design for Trade Mark.

New Books and Periodicals Received.

THE ATLANTIC MONTHLY. Published by Ticknor & Felds, Boston.

The July number is full of patriotism and heart-stirring literature. It opens with an ode, entitled "Marching Orders," the periods of which thrill upon the ear like the sound of marching armies going forth to battle. It also contains a spirited and touching article on "Washington as a Camp," by the late lamented Major Winthrop; also a touching biography of Colonel Ellsworth, who was assassinated at Alexandria.

AMERICAN JOURNAL OF PHOTOGRAPHY. Published by Charles A. Seely, No. 244 Canal-street, New York.

This orignal, able and most useful journal connected with photography, commenced a new volume this month, in an enlarged and improved style. It is a semi-monthly publication, and deserves the support of the entire photographic profession. Its editor is an able chemist, as well as professor of photography and the allied arts.

Notes and Queries

H. H., of Mass.—Your pistol bomb is an old thing, and not patentable. The drilling of radial chambers for powder and ball communicating by vents with a central fuse was suggested long ago, as an improvement on the shrapnell shell.

A. D., of Mass.—Of your specimens, No. 1 is a sulphuret of iron becoming oxydized; No. 2 is quartz; No. 3 is one of the complex earths—it contains clay and magnesia; and No. 4 is gneiss or stratified granite, the shining particles being mica. All four are worthless. You would gain nothing by placing an undershot wheel below an overshot. On the contrary, you would lose that portion of the fall required to fill and empty the buckets of the second wheel.

R. E. G., of N. Y.—You will find illustrations of a good valve for an oscillating engine on page 81, Vol. XII. (old series), of our journal, and another on page 256, Vol. I. (new series). The former was invented by Cridge & Wadsworth, of Pittsburgh, Pa., and the latter by Adam Wood, of Arsenal, Pa

Y. G., of N. Y.—You are entitled to withdraw $20 on your rejected case if it was filed in the Patent Office previous to the 2d of March. Since that time the schedule of fees has been changed. We mail you one of our pamphlets of advice to inventors, which we send free to any one who may wish a copy.

N. P., of N. Y.—You seem to be prolific of inventions, and it seems to us that your ideas are novel. Send us sketches and a description of your devices, and we will carefully examine them.

C. B. K., of Mass.—You will find a good rifle illustrated in this number of our paper. We think this is a most excellent weapon

T. H. W., of Pa.—We have received your very kind note in reference to the renewal of your subscription. We certainly feel very much obliged to you for your past exertions in endeavoring to extend our circulation, and we regret exceedingly to hear of your misfortunes as connected with business at the South. We must all suffer from this heavy national calamity, and do our best to support the government, without which we are in a state of anarchy and disgrace.

B. H. J., of N. J.—We suppose that no nation in the world is making stronger efforts toward advancing in the arts than France, and we infer from this fact that useful inventions ought to be valuable there. By a recent decree, the Emperor appropriates 40,000,000 francs to enable French manufacturers to purchase improved machinery, and thus compete with the English manufacturers. We are not possessed of full particulars of this judicious movement.

D. C., of N. Y.—Ellsworth, in his act of taking possession of the secession flag at Alexandria, showed courage; but it was a hasty and ill-advised movement. Having taken military possession of the town under the orders of the goverement, he had a right to remove an emblem of offence to that government. He should have first called upon the proprietor of the Marshall House to remove it; and, upon being refused, a force adequate to this end ought to have been detailed by the Colonel. He should have remained in charge of his regiment.

B. H. W., of C. W.—The specimen of stone which you send us is perfectly worthless. We are much obliged for your suggestions, and will take them into due consideration. We hope you will be able to procure a large list of subscribers in your vicinity.

C. C., of Conn.—It is impossible to fix any definite scale of values respecting patents. This question has been discussed time and again, without any practical results. It recently came up before a convention in Paris, composed of manufacturers, men of science and merchants. It was proposed to abolish patents and to substitute a system of government payments proportioned to the value of the respective inventions. The discussion ended with a very general impression that the idea was not practical, and that a system of laws granting patents was the very best which had ever been devised for fostering art and science.

P. S., of Md.—Brown linen cannot be prevented from washing white, as the repeated application of soap and water bleaches the linen. We do not think there is any chemical that will aid you in this matter.

F. H., of Pa.—You are unquestionably right in asserting that, "since the introduction of gunpowder and firearms, wars have been less sanguinary, because decided with greater rapidity." The history of ancient and modern warfare fully confirms this assertion.

E. B., of N. Y., asks:—"Is it patentable to apply an old principle to a new purpose?" We answer yes, provided a new and useful result is thereby produced.

H. L., of N. Y.—Spectacles which would enable persons to see at night would be very useful, and, no doubt, very profitable to the discoverer. They would be of great advantage to night-scouting parties.

D. D. G., of Mass.—If you have been a careful reader of our paper, we are surprised that you should be ignorant of the name of the Commissioner of Patents. Refer to your back numbers, and you will soon find out.

H. C., of Md.—We have examined your alleged improvement in conical shells, and it seems to us that you have hit upon an excellent idea. We advise you, by all means, to try an experiment and test its merits. There may be some radical defect in it that can only be found out by actual trial.

S. M. G., of Vt.—We are glad to learn that your invention works well, and that you are offered a liberal sum for the right. The patent law does not require a citizen to work or put on sale his patent within any specified time. This is required only of foreigners.

E. M. F., of Pa.—We believe you can obtain the composition used in printers' rollers in Philadelphia, from any person who sells printers' materials; if not, E. R. Webb & Co., corner of Fulton and Dutch streets, this city, will supply you.

R. W., of N. Y.—The city of Washington was taken by the British, under General Ross, on the 24th of August, 1814. The army of the invaders numbered only 4,000 men. They landed at Benedict, on the Patuxent, on the 20th, and marched for three days to the capital. The American militia, numbering 8,000, did not stand five minutes after the British opened fire; but the sailors under Captain Barney defended their battery to the last inch. Rather than retreat, they suffered themselves to be cut down at their guns. General Ross declared that had the militia behaved like the sailors the British army would have been annihilated. They lost 500 men mostly by the cannon of the seamen.

R. W. T., of N. Y.—If you propose, by establishing iron works on the line between this country and Canada, to evade the revenue laws, of course it would not be permitted.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, June 26, 1861:—

A. M. O., of Wis., $25; O. B. & K., of O., $15; C. C. P. W., of Mass., $15; W. E. F., of Mass., $25; J. H. S., of N. Y., $15; A. W., of N. Y., $43; J. R., of N. Y., $15; W. H. B., of Mass., $15; J. W. C., of Mich., $10; L. D. G., of N. J. $15; G. K., of N. Y., $250; F. G. L., of Iowa, $25; G. W. B., of N. Y., $43; R. W., of Pa., $15; C. M. P., Jr., Mass., $25; F. & H., of N. Y., $10; S. & L., of N. Y., $20; J. L., of Mich., $15; B. & R., of Ohio, $25; A. H. H., of Mass., $15; J. J., of N. Y., $75; G. W. B., of L. I., $20; H. H., of Ill., $10; S. I., of Pa., $10; G. D. H., of Ill., $15; J. M., of O., $15; G. R. S., of Wis., $20; E. E., of Cal., $20; W. F. Q., of Del., $15; L. S. H., of Cal., $15; T. C. H., of Mass., $15; J. B. McM., of N. Y., $225; T. F., of Mass., $15; C. McW., of Cal., $10; W. B. R., of Cal. $30; L. C., of N. Y., $15; W. H., of Ct., $15; J. C., of Pa., $20; J. C. B., of N. Y., $20; N. G. S., of N. Y., $20; L. B. S., of Ct., $20; B. T. B., of N. Y., $20; B. S., of N. Y., $20; C. B., of N. Y., $20; G. & S., of O., $45; D. S., of Mass., $20; N. C., of N. Y., $20; C. H. F., of N. Y., $20; E. D. W., of N. Y. $20; E. C. M., of Iowa, $25; F. B. McG., of Md., $25; W. M., of Mass., $25; M. D. C., of Vt., $25; E. M. A., of Iowa, $25; D. L., of Vt., $20; W. M., of Mass., $45; A. D., of N. J., $20; O. L., of N. Y., $40; P. D., of N. Y., $25; S. E. O., of Ohio, $25; A. M., of N. Y., $25; G. & S., of Ohio, $25; C. N. B., of Pa., $25; W. S., of N. Y., $15; W. F., of Ill., $35; C. H. B., of Pa., $20; E. S., of Mass., $20; L. H. D., of Iowa, $20; A. H. B., of N. Y., $43; J. G., of L. I., $20; E. K. M., of N. J., $25; G. S., of N. Y., $20; S. & L., of N. Y., $10; S. S. H., of Mass., $25; B. M., of Ind., $15; J. B., of Ohio, $25; H. W. W., of Cal., $20.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from June 19 to Wednesday, June 26, 1861:—

R. W., of Pa.; F. G. L., of Iowa; J. W. C., of Mich.; S. E. O., of Ohio; A. M. O., of Wis.; B. & R., of Ohio; W. F., of Ill.; S. S. H., of Mass.; A. H. B., of N. Y.; C. M. P., Jr., of Mass.; P. D., of N. Y.; E. K. M., of N. J.; G. W. B., of N. Y.; W. E. F., of Mass.; G. S., of N. Y.; G. W. B., of L. I.; M. D. C., of Vt.; J. B., of Ohio; B. M., of Ind.; A. M., of N. Y.; H. W. W., of Cal.; S. & L., of N. Y.

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CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS—PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner: Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO No 37 Park-row New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

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Improvement in Canal Boats.

Notwithstanding that the introduction of railroads has put a stop to the construction of canals, there are still in operation in the United States more than 3,000 miles of the latter, and the great numbers of canal boats which are constantly decaying and passing out of service, renders the building of these small craft a very great business. In place of the usual mode of framing them, a plan was adopted some time since of constructing them with a log on each side along the bilge, to which the side and floor timbers were secured. Messrs. McCausland & Sons, practical boat builders, of Rondout, New York, have invented an improved mode of securing the frames to the side logs, which is illustrated in the accompanying engraving.

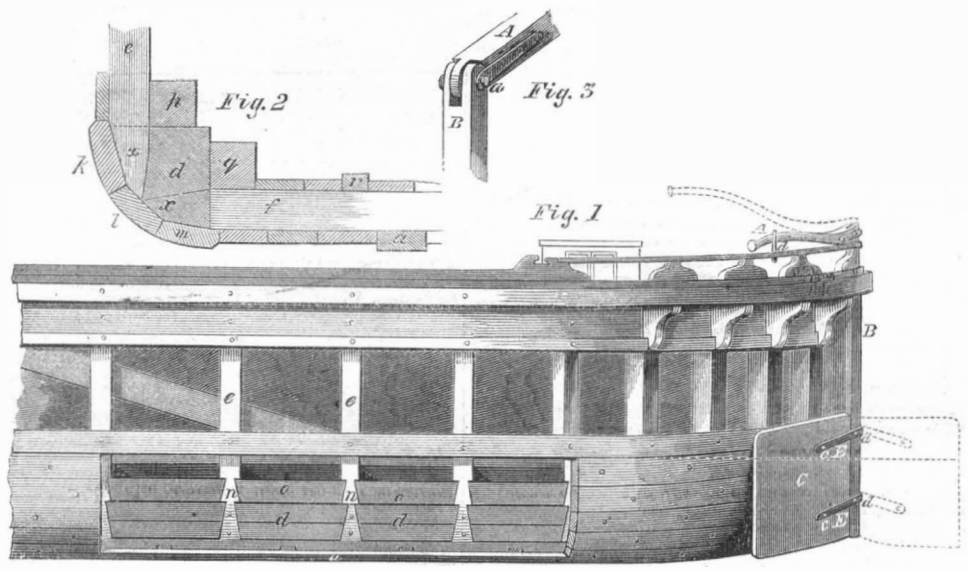
Fig. 1 is a side view of a portion of the boat with a part of the outer planking removed, and fig. 2 is a cross section of the bilge on one side, showing the form of the log with its connections. The stick of timber marked *a*, running fore and aft, is connected to the stem and stern posts by a knee or chock extending far enough out on the bilge timbers to get sufficient fastening through them and give ample strength to the bow and stem. The bilge timbers, *d*, extend from the stem to the stern post, and may be 8x12 inches square or larger, as the size of the vessel may demand. To the bilge timbers the side timbers, *e*, and the floor timbers, *f*, are secured by dovetail joints; the dovetails tapering, as shown in fig. 2. The outer and lower corner of the bilge timbers is beveled, *g*, and an inclined face both above, *h*, and below, *i*, is also formed to allow of the planking of the timbers. The plank to these three faces will form a gradual turn, and will fully protect the bilge timbers from exposure to the water, and from being bruised and broken away. A second dovetail on the side timbers, marked *n*, is formed to receive the dovetail chocks, *o*. These chocks fit in between the side timbers and are fastened by spikes to the bilge timber, and to a fore-and-aft piece, *p*, of the length of the bilge timber, lying above it, and inside of the side timber. Another fore-and-aft piece, *q*, extends along the side of each bilge timber and above the floor timbers, being fastened to both the floor and bilge timbers. Keelsons, *r*, are placed directly under the hatch combings so as to receive two stanchions under each beam. The ceiling is intended to be placed between the bilge and the clamps.

It will be seen that boats made on this plan will be of great strength and very durable, and will be easily repaired. By dispensing with the ceiling between the bilge and the clamps (rendered possible by the second dovetail joint and chocks) the side timbers will be kept in better condition and more room exist for the cargo. Alternately attaching the floor and the side timbers to the bilge timbers is also regarded as very advantageous in this class of vessels. This plan also obviates the necessity of obtaining pieces of timber of a natural curve for futtocks, and by keeping the parts dry prevents the rapid decay of the timbers and planking. Provision can easily be made for salting the timbers if desired.

These boats have been in use on the Delaware and Hudson Canal for the last four years, and are said to be a perfect success, never having been taken out of the water for repairs, and carrying from 10 to 16 tuns more than boats of other styles now in use.

The engravings also illustrate an improved mode of connecting the tiller with the rudder stock of canal boats, invented and patented by the same parties, by which the boat is not only managed with more facilty, but which also permits the boat to be made of some two feet greater length. This plan is plainly shown in figure 3. Instead of a mortise through the rudder stock to receive the tiller, the former has a slot cut in its upper end, into which a tennon on the end of the tiller is fashioned to fit. Then two iron straps, fastened on each side of the tiller embrace the end of the rudder stock; a bolt passing horizontally through the pieces to form a hinged joint, so that the tiller may be swung over the end of the rudder stock. By this arrangement, on entering a lock, the tiller can be turned over back, parallel with the rudder, and the latter brought close to the side of the boat, both being entirely out of the way of the gate. A pin on the edge of the boat holds the tiller in its place when turned back.

Both of these inventions were made by John Jefferson and James McCausland. The patent for the one first described was granted September 21st, 1858, and that for the improved tiller May 14th, 1861. Further information in relation to either may be obtained by addressing McCausland & Sons, at Rondout, N. Y.



M'CAUSLANDS' IMPROVED CANAL BOAT.

Experiments with the Induction Coil.

At the London Mechanics' Institution, E. Wheeler, C. E., recently lectured on the induction coil, the apparatus used by him being of his own design and construction. In the course of his experiments, he showed that, in common coal gas of moderate density, the spark passed in zigzag lines of emerald green, Through pure hydrogen, it resembled forked lightning of the deepest crimson. Atmospheric air reduced to a vacuum, showed a broad ribbon of gentle mauve a yard long. A similar line of light made to pass over a wine decanter of Uranium glass, in an exhausted receiver, exhibited upon the decanter tints of extreme richness. A hock wine glass *in vacuo* was made the recipient of a current from the coil; and the electricity, streaming over the edges of the wineglass with roseate tints, seemed like a material liquid flowing from some invisible source, and changing into a brilliant electric cascade. A line of sky-blue light, being caused to traverse an electro-magnet, was seen to revolve raund its pole, an illustration of the close relations between light, electricity and magnetism. An example of the stratified form which the light occasionally assumes was supplied in a large glass tube of rarefied carbonic acid gas. In hermetically sealed glass tubes of fantastic shapes, nitrogen gas exhibited pink and carmine tints; sulphurous acid gas, an azure blue; hydrogen, a deep crimson; carbonic oxyd, green. Phosphoric acid gas was visible in the tube by a faint green light for some seconds after the discharge had ceased. A chromatic star, in rapid rotation, and with striking contrasts and endless combinations of color and light, formed the concluding experiment.

Calculating the Speed of Screws.

If the pitch of a screw, in feet, be multiplied by the number of turns per minute, and two places of decimals be pointed off from the right hand of the product, the latter will almost express the speed in knots per hour, including slip. Thus a screw of 30 feet pitch, making 45 turns per minute, will make $(30 \times 45 = 1{,}350)$ 13.5 knots nearly per hour including slip. 1,350 in this case is the number of feet of horizontal motion, including slip, developed per minute, and as a nautical rule is very nearly 6,000 feet, and as there are 60 minutes in an hour, the effect of multiplying 1,300 by 60 and dividing the product by 6,000, is, of course, the same as pointing off two places of decimals at once.

By multiplying the pitch of a screw by its revolutions per minute and dividing by 88, we obtain the speed of the vessel without allowing for slip, which is generally about 11 per cent. The above rule is sufficiently correct for all common purposes.

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